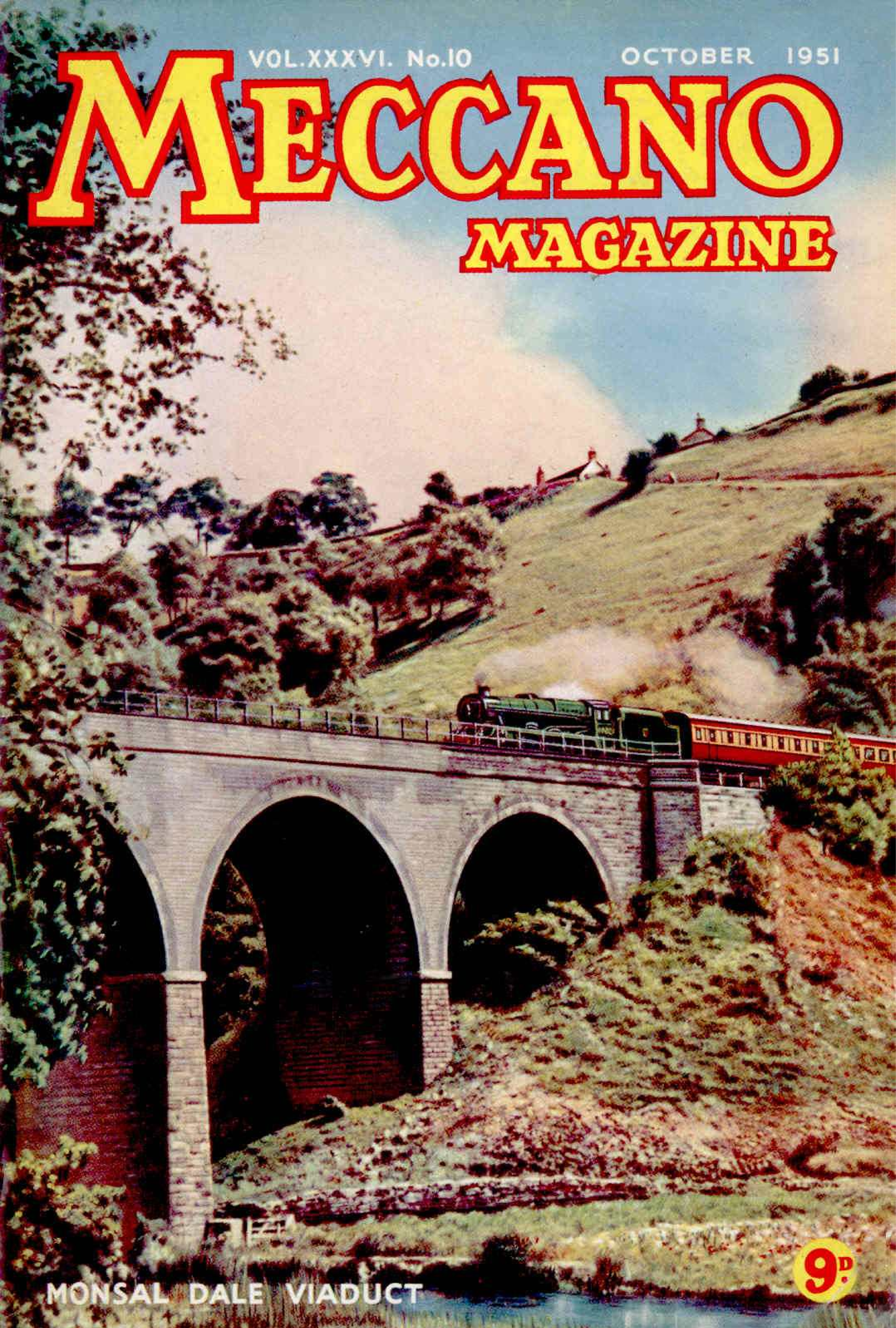
VOL. XXXVI. No. 10 OCTOBER 1951

MECCANO MAGAZINE



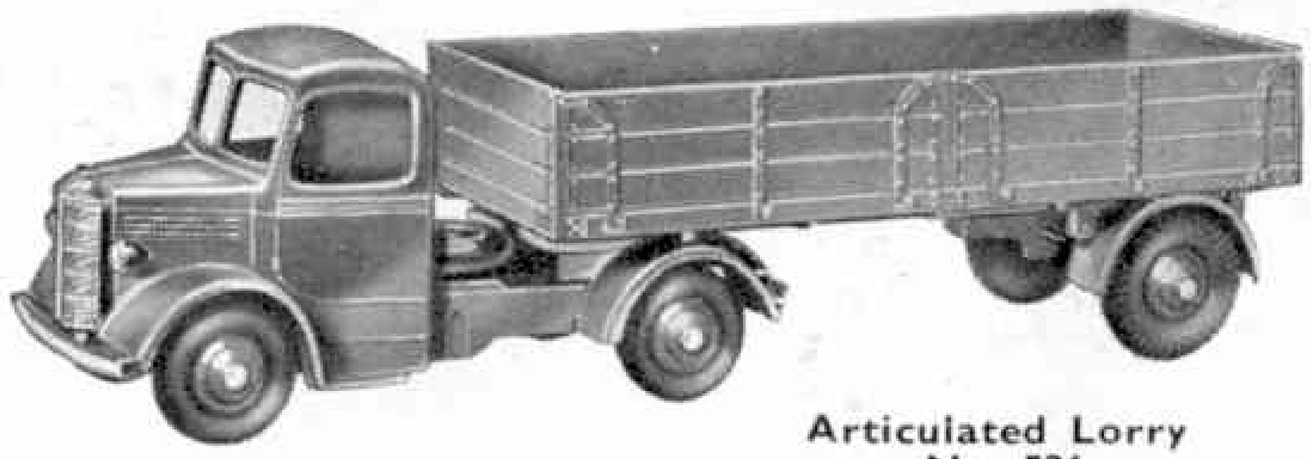
MONSAL DALE VIADUCT

9D.

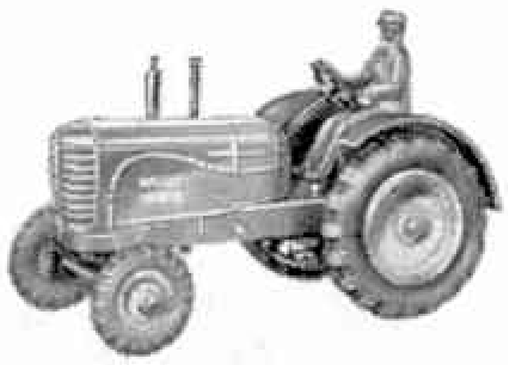
THE MECCANO MAGAZINE

DINKY TOYS

Hudson
'Commodore' Sedan
No. 139b

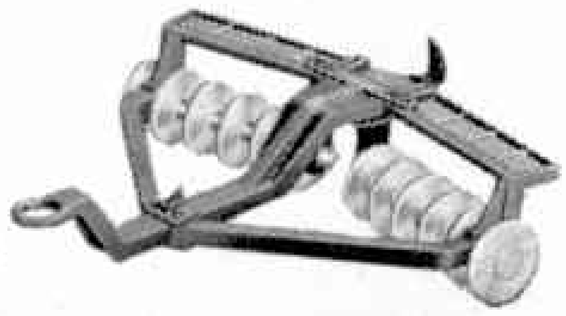


Articulated Lorry
No. 521



Massey-Harris Tractor
No. 27a

Harvest Trailer
No. 27b



Disc-Harrow
No. 27h

Ford "Fordor" Sedan
No. 139a

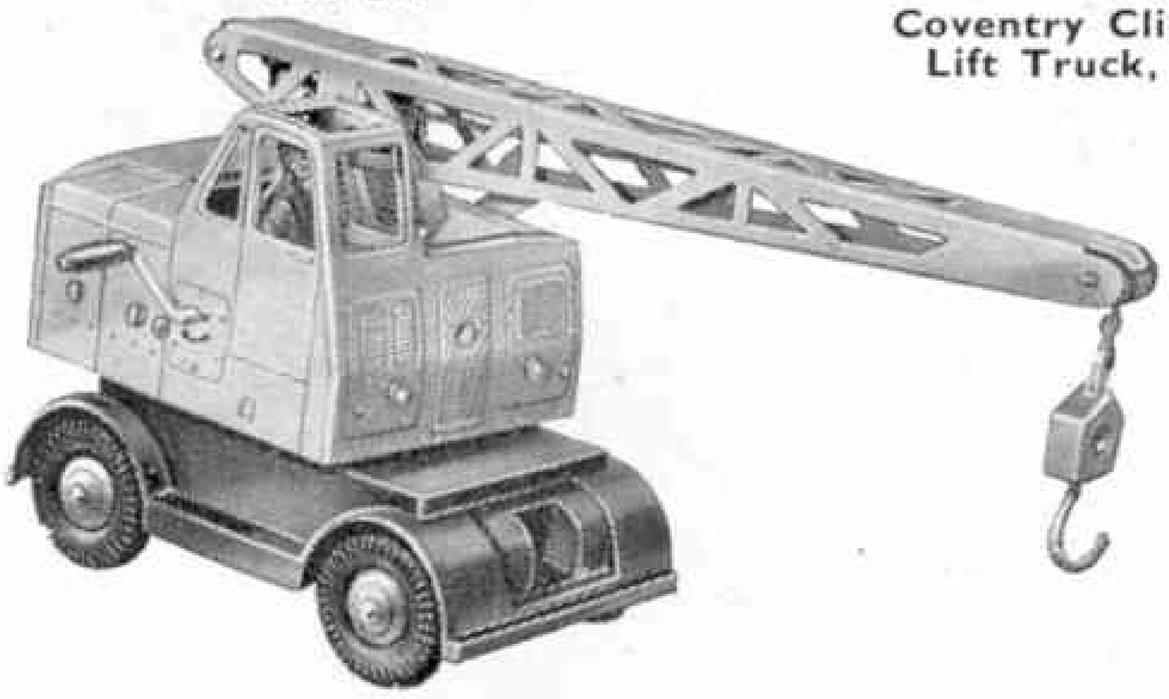
Refuse Wagon
No. 25v

Rover 75 Saloon
No. 140b

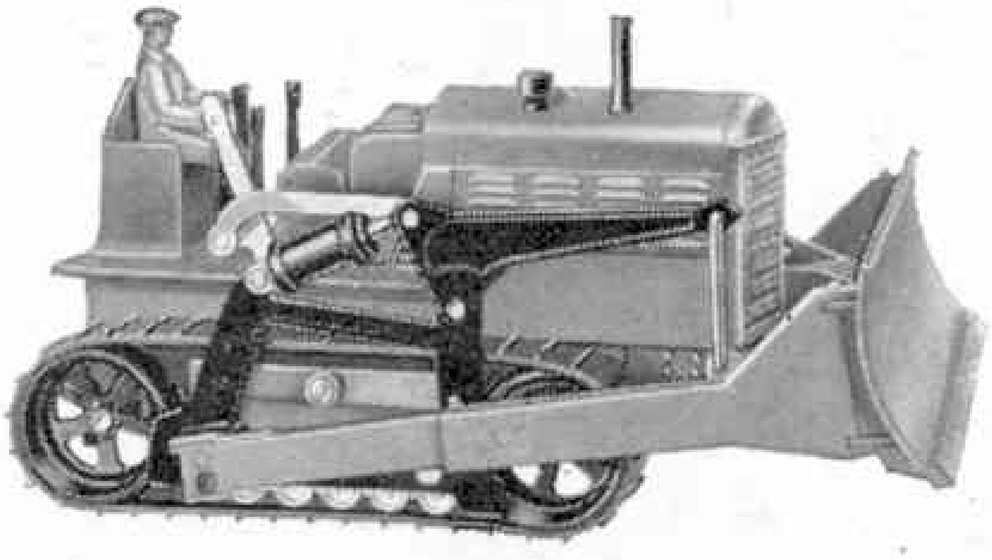
Electric Dairy Van
No. 30v

Coventry Climax Fork
Lift Truck, No. 14c

Austin 'Atlantic' Convertible
No. 140a



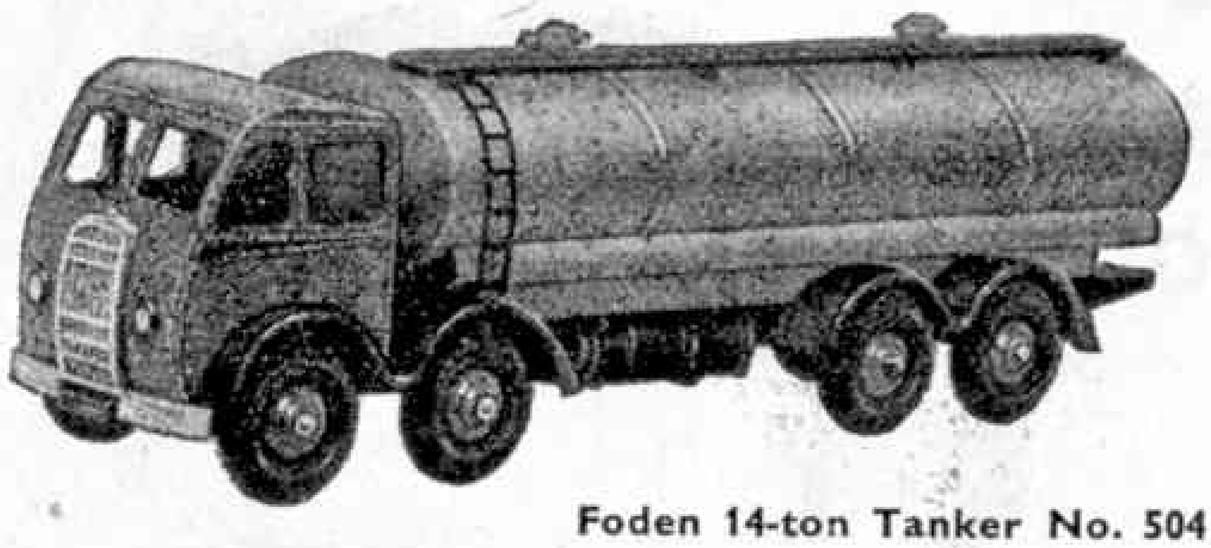
Coles Mobile Crane
No. 571



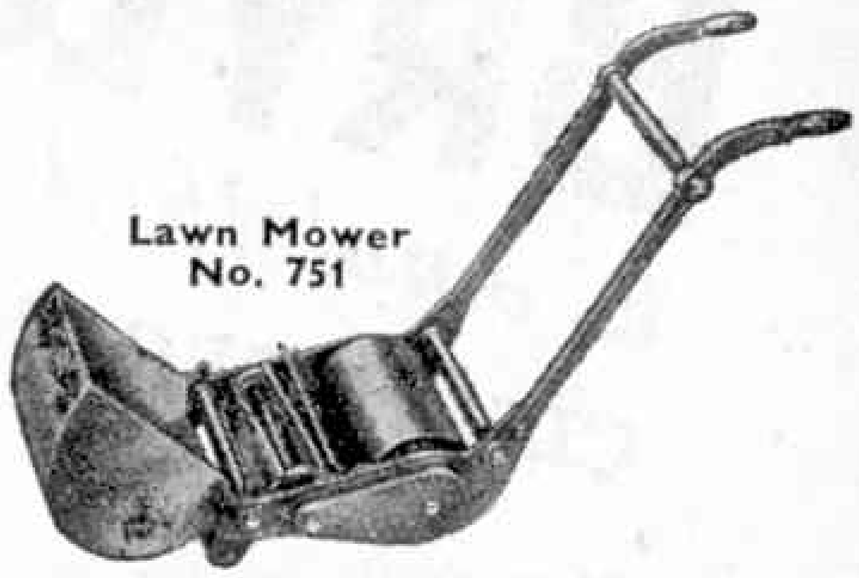
Blaw Knox Bulldozer
No. 561

MADE IN ENGLAND BY MECCANO LIMITED

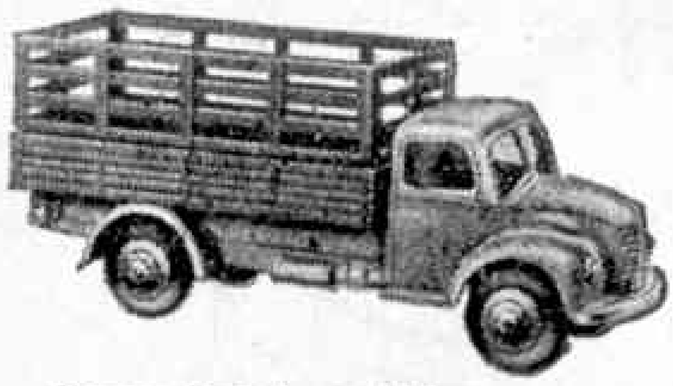
DINKY TOYS



Foden 14-ton Tanker No. 504

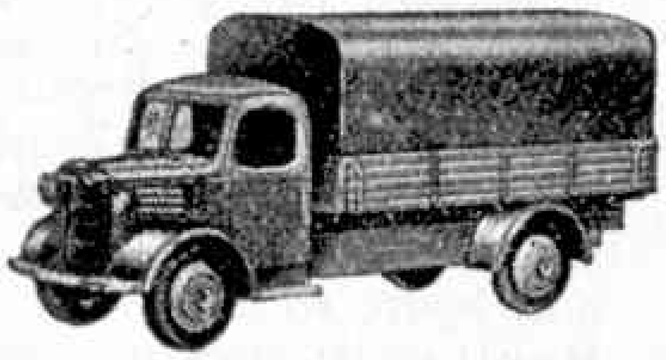


Lawn Mower
No. 751



Farm Produce Wagon
No. 30n

Estate Car
No. 27f

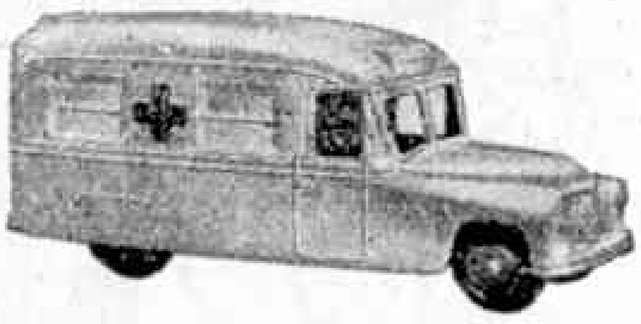


Austin Covered Wagon
No. 30s

The Standard "Vanguard"
Saloon, No. 40e

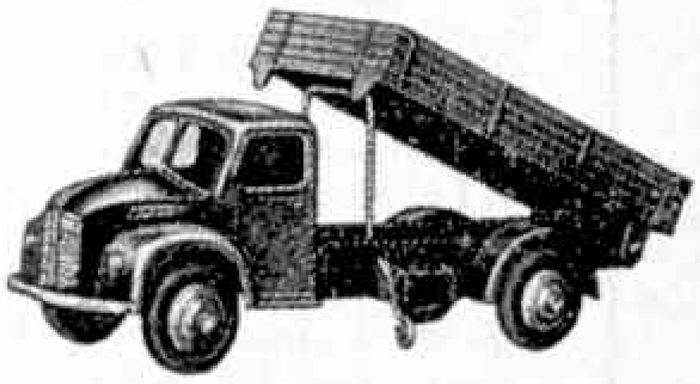
Morris Oxford Saloon
No. 40g

Breakdown Lorry
No. 25x



Daimler Ambulance
No. 30h

Bedford Truck
No. 25w



Rear Tipping Wagon
No. 30m

End Tipper
No. 25m

Guy 4-ton Lorry
No. 511

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royds 38/38

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Whatever the kind of vehicle or condition of service, BTH electric equipment, of exceptional reliability and proved performance, can be supplied.

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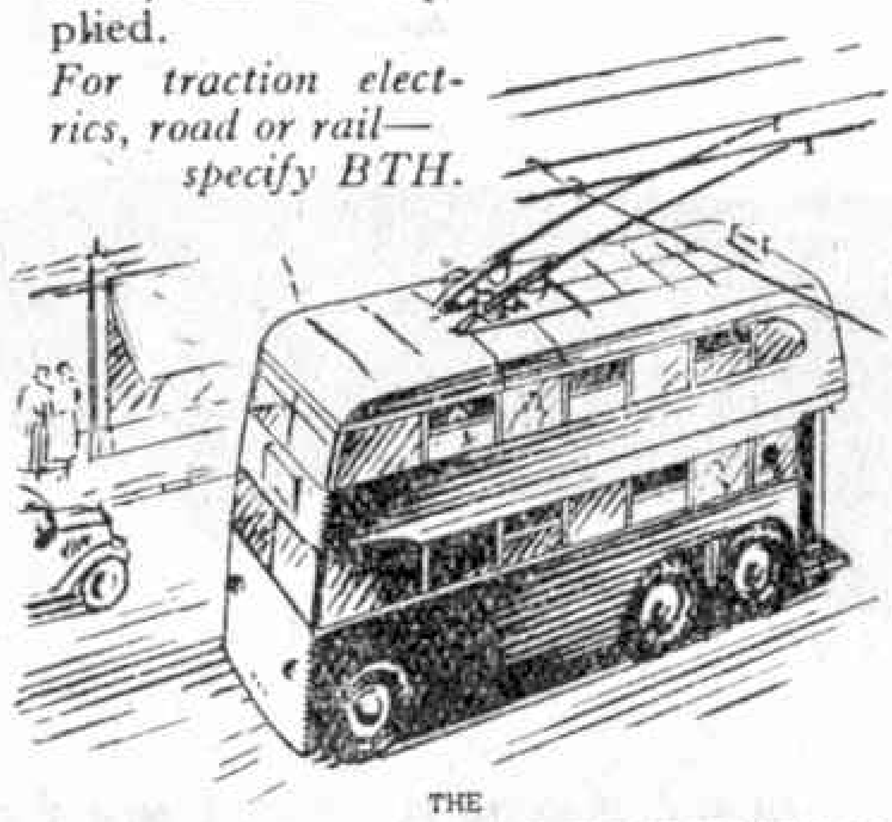
by B T-H



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MADE IN ENGLAND

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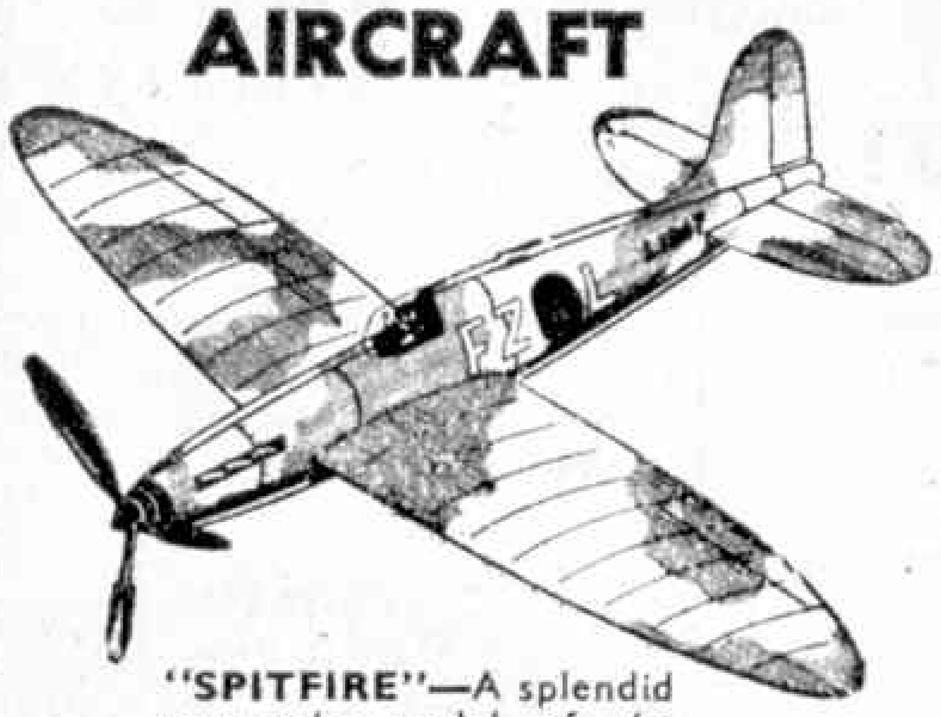
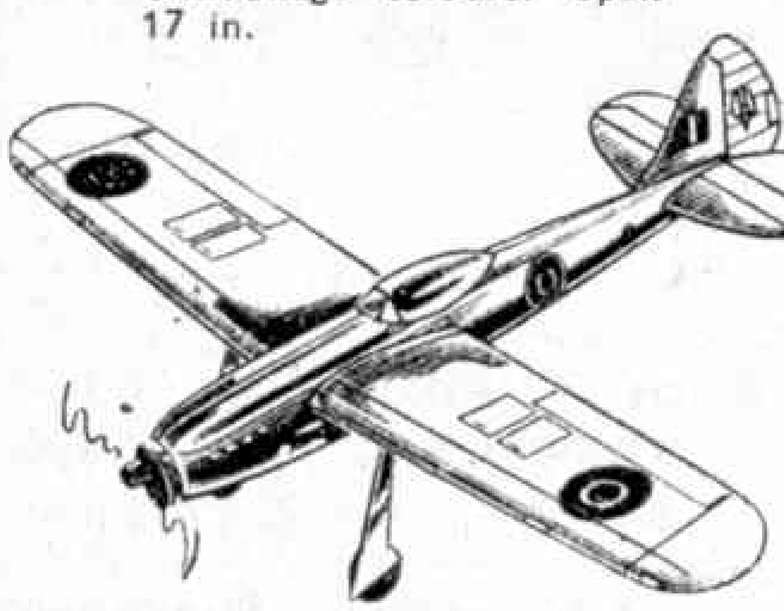


"SPITFIRE"—A splendid near-scale model of the famous fighter in camouflage colours. Span 17 in.



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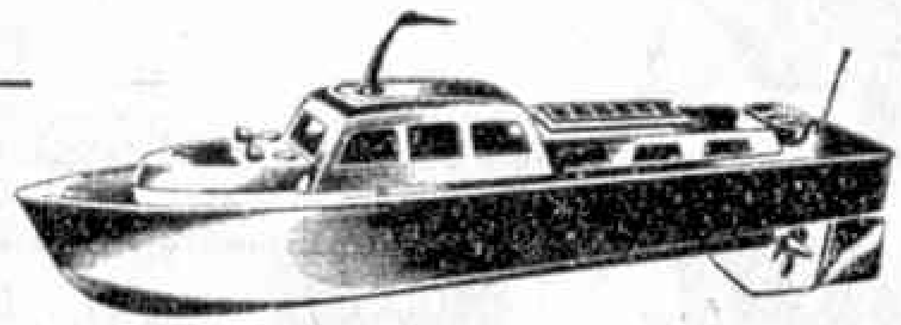
All PENGUIN watercraft are precision moulded to ensure accuracy of detail. The new Ocean Racer illustrated is a perfect model of the latest type racing cruiser and has special, simplified Bermuda rig with best quality sails and automatic rudder for true course keeping. Hull length 16 in.

Scale Model OCEAN RACER

Your Local Dealer will be pleased to show you these models and give you all prices. We cannot supply direct.

CLOCKWORK SCALE MODEL BOATS



11 in. CABIN CRUISER—A fast, clockwork-powered cruiser with beautifully detailed hull and deck. Complete with dinghy, pennants, navigation lights, etc.

TUGBOAT ANNIE — A Thames tug in miniature with specially geared clockwork motor Length 7½ in.

In addition to the models illustrated here the PENGUIN range includes the 6 in. High Speed Cruiser, 7 in. "Clyde" Cruiser, 9 in. "Solent" Cruiser, 17 in. "Avon" Cruiser, 9 in. Naval Pinnace and 7½ in. Fishing Drifter. All are powered by specially geared clockwork units for long fast runs and are finished in realistic colour schemes.

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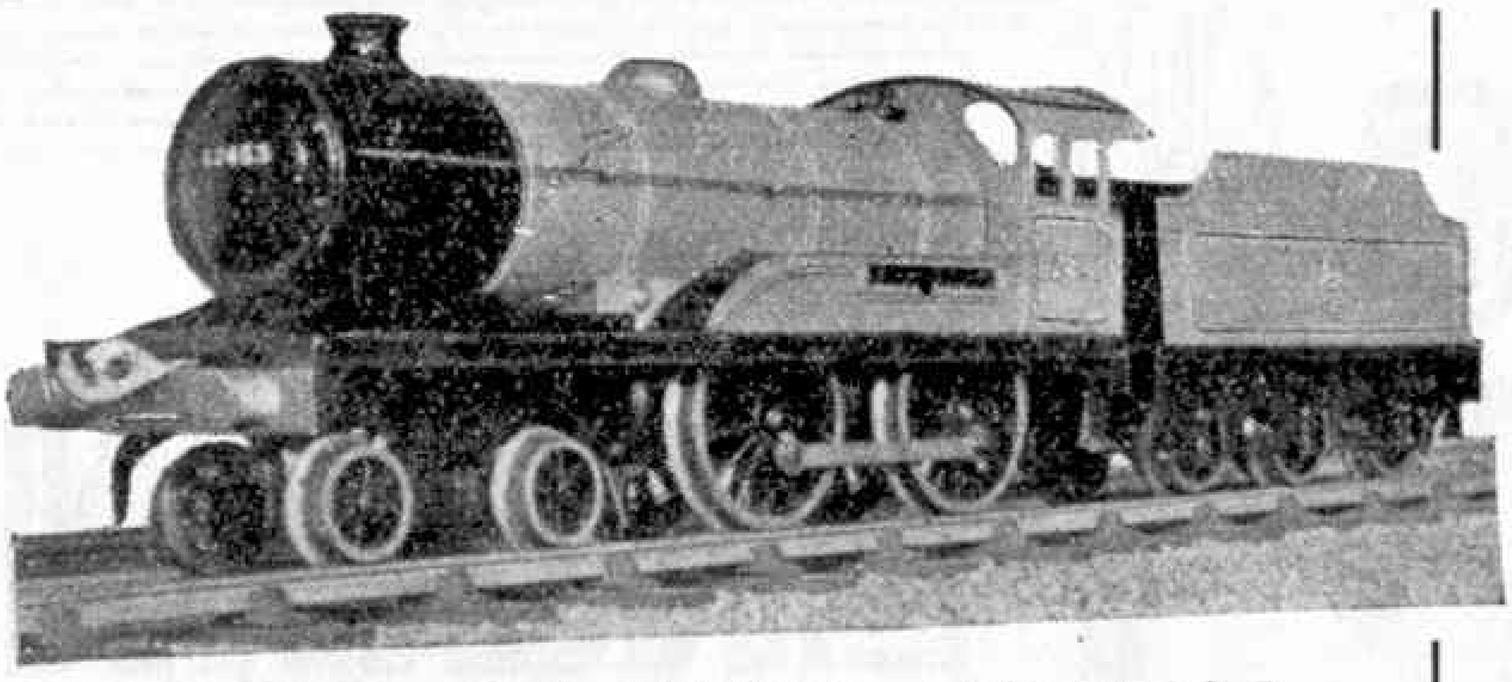

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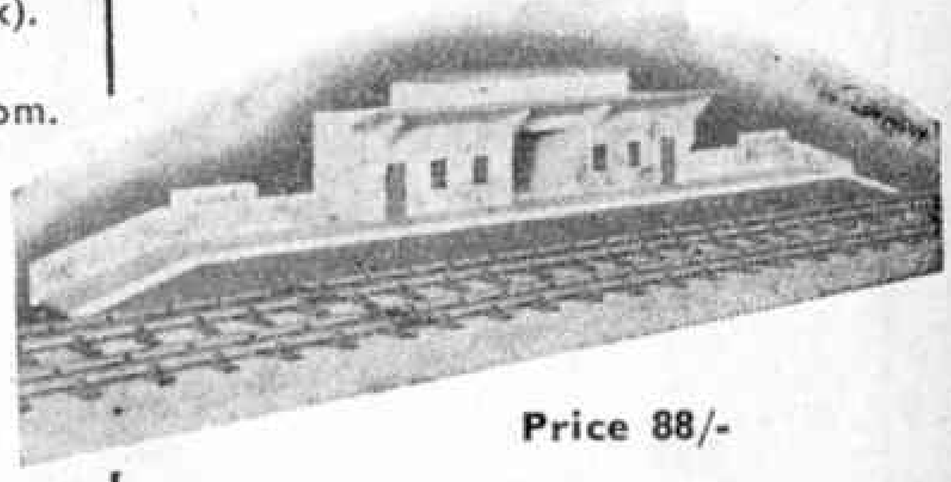

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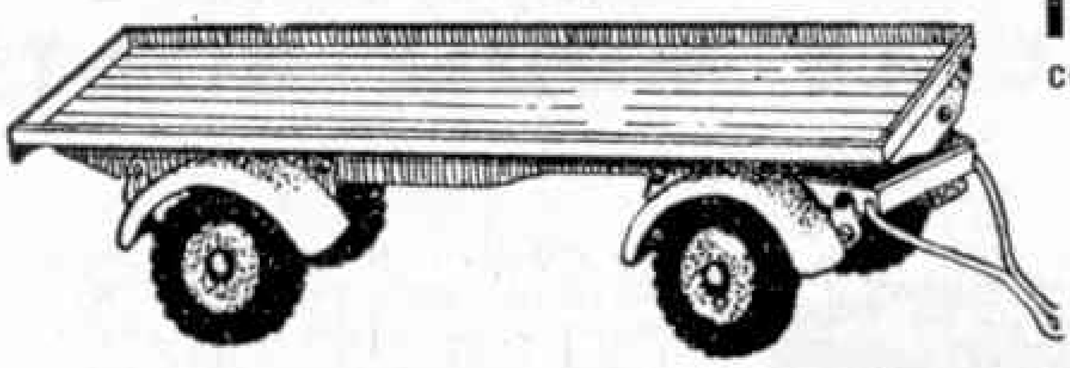

18'6 complete

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FODEN TIPPER ... 65/-
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Both mechanically driven

All Abbey Shackleton models take down like the real thing

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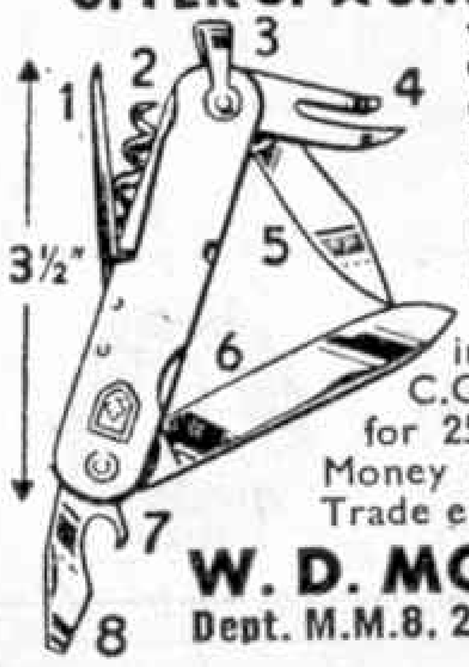

with EIGHT attractions—Awl, Corkscrew, Safety Ring, Tin-Opener, 1½ in. Blade, 3 in. Blade, Bottle Opener, Screw-driver. Finest French make, razor-sharp, strong yet light and handy. Easily worth double.

Send 9/- for immed. delivery. C.O.D. 1/- extra. 3 for 25/-. 5 for 40/-. Money back guarantee. Trade enquiries invited.

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Get this new and improved gas lighter element to-day! It will outlast all others. Works on 1.5 v. or 2.5 v. battery. Current consumption is negligible and dry-cells last up to ten times as long with JET-VITA—the new wonder element. **A six months written guarantee is given with each element.**

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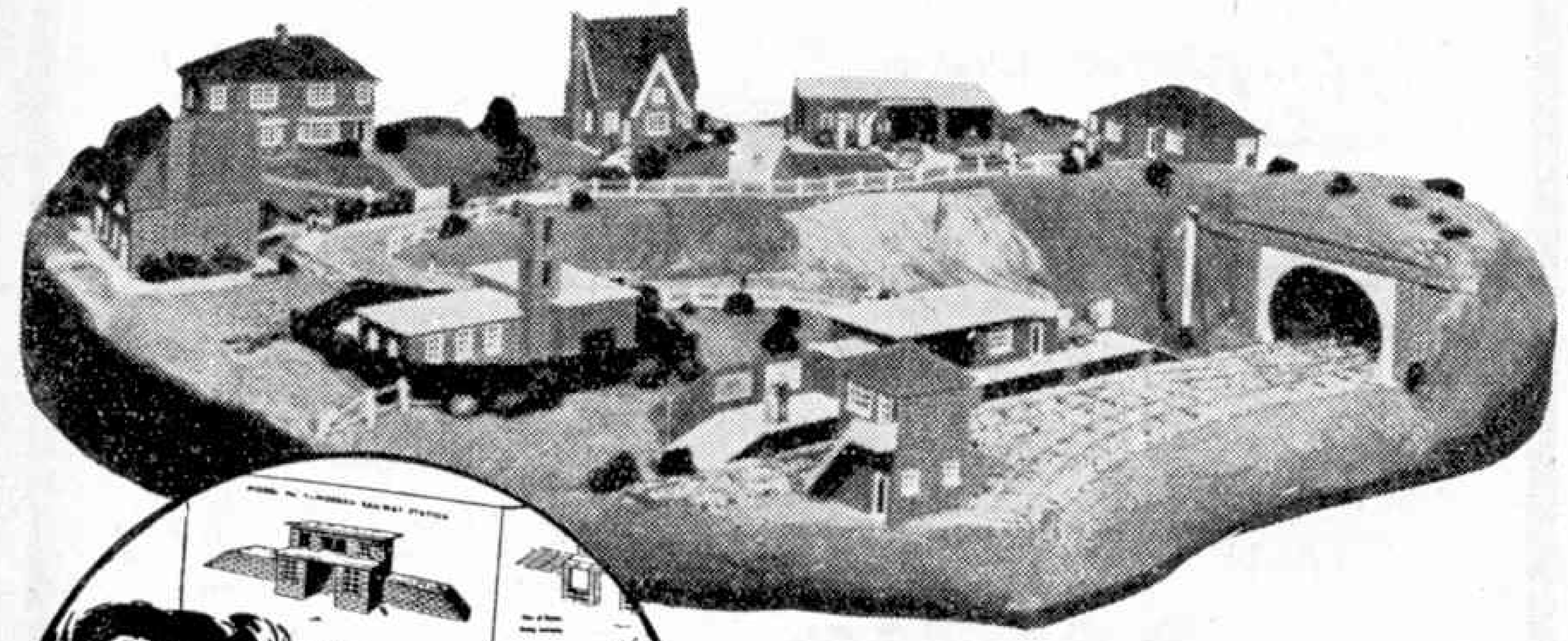
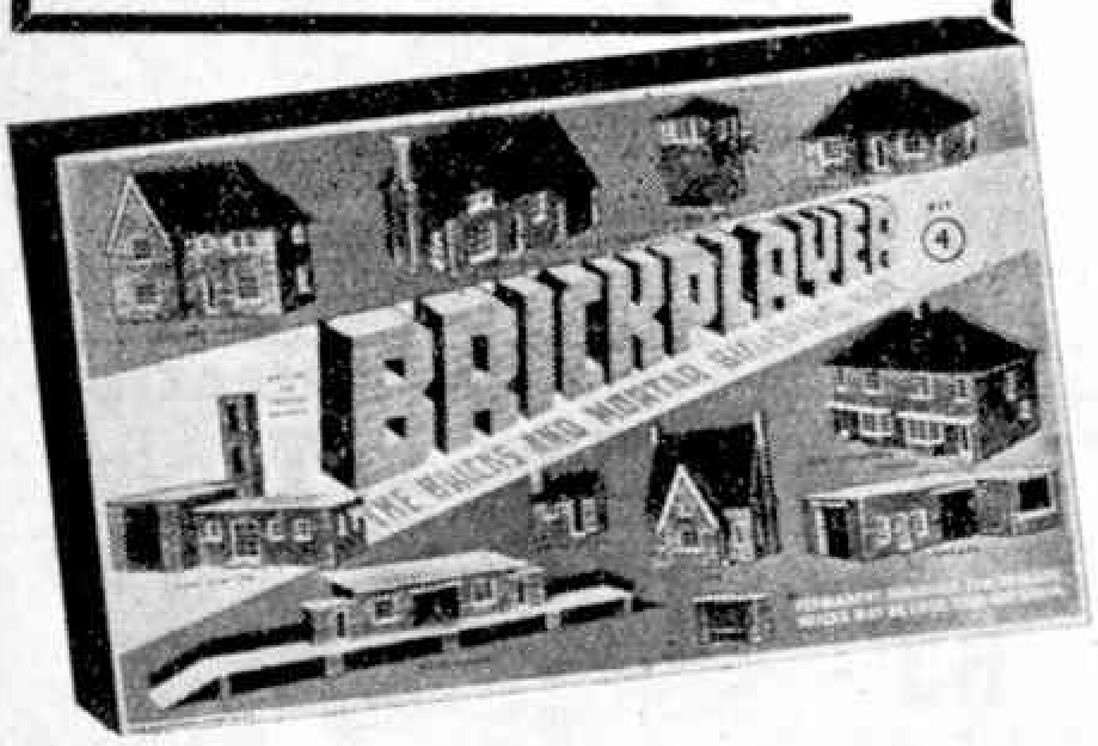


ENTER FOR THE BRICKPLAYER COMPETITION

Prizes of £10 10s., £5 5s., and £3 3s. and a number of consolation prizes of Brickplayer Accessories will be awarded for winning models.

Write for full details.



Build this Charming Model Village with

BRICKPLAYER

Brick and Mortar Building Kit and Accessories

The Brickplayer Kit contains miniature bricks in all required shapes, mortar, roofing, metal windows and doors, plans and instruction booklet. All models are architect designed to "0" gauge scale. Buildings can be permanent or dismantled by merely soaking in water, and the bricks used again and again.

Brickplayer Kits at 28/6 and 52/6 and Accessories are available from good toy-shops and stores.

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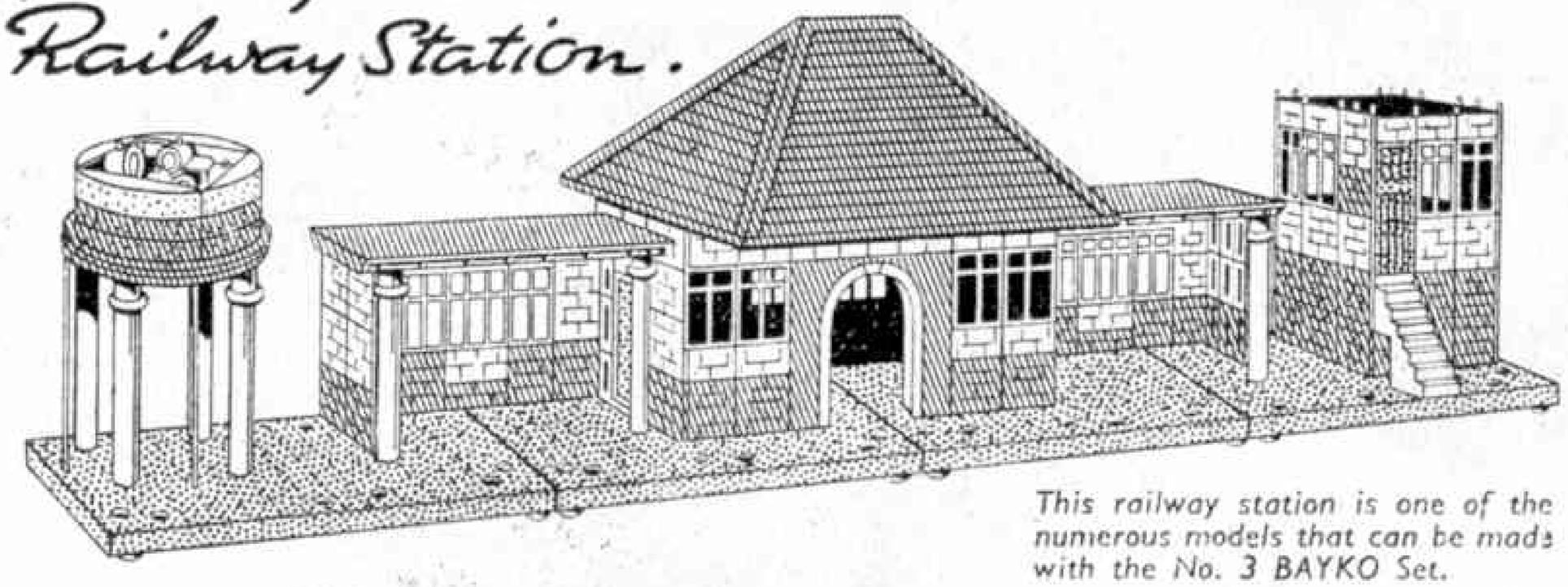
YOUR IDEAL CHRISTMAS GIFT

Build your own Railway Station.



This railway station is one of the numerous models that can be made with the No. 3 BAYKO Set.

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BAYKO
the Original Plastic
BUILDING SETS

Made from richly coloured, high-grade plastic material, BAYKO is beautifully finished, easily cleaned and will survive years of hard treatment.

PRICES:

No. 0	15/-	No. 0x	7/6
No. 1	22/6	No. 1x	15/-
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GIBRALTAR ROW, LIVERPOOL 3

GAMAGES

CORRECT SCALE SIZE '0' GAUGE

RAILWAY SIGNALS

No. 1 Signal Box with 4 Signals	15/-
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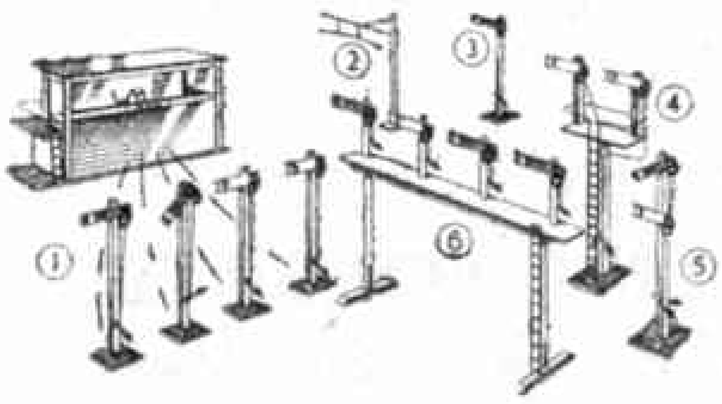
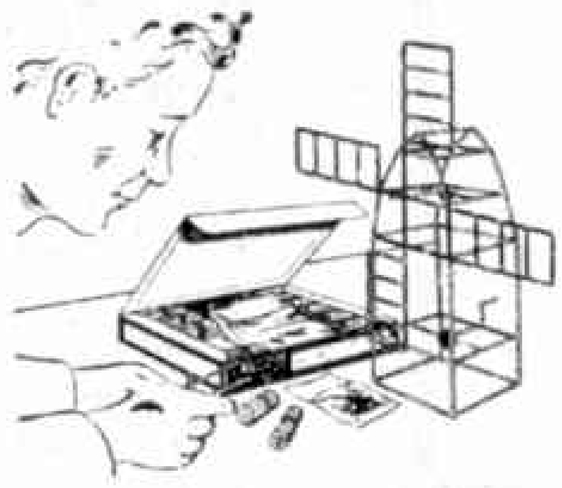
No. 3 Small Signal, 1 arm	1/6
No. 4 Junction Signal	5/11
No. 5 Small Signal, 2 arm	2/11
No. 6 Gantry Signal	7/6

Post and Packing extra



'ALCON' CONSTRUCTION SET



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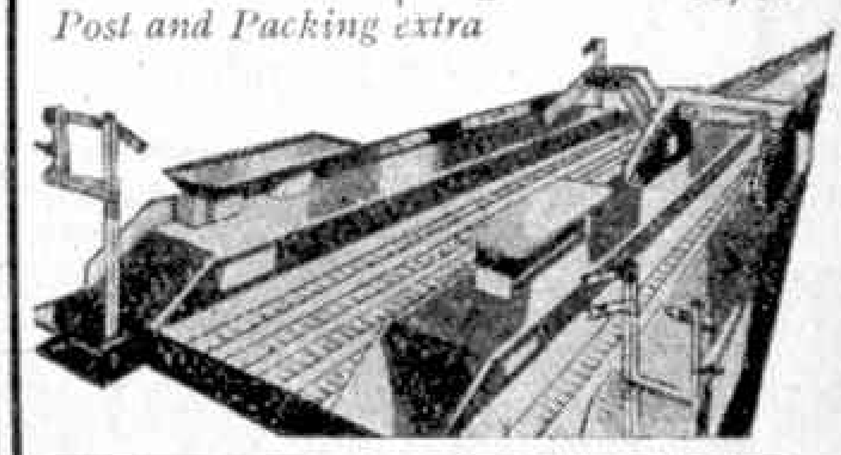
True Scale '00' Gauge

STATIONS & SIGNALS

Station	6/11	2 Arm Signals	2/2
Island	6/5	2 Arm Gantry	2/11
Tunnel	2/11	3 Arm Gantry	3/7
Platform	5/6	4 Arm Gantry	5/11
Overbridge	8/9	Terminal Station A	17/11
Footbridge	4/6	(not illustrated) B	19/11
1 Arm Signal	1/6		

Post and Packing extra



LATEST MODEL

'PALITOY' ELECTRIC TRAIN SET

BATTERY OPERATED

Simplicity and Strength are the major features of this Set, making it ideal for youngsters. Full remote forward/stop/reverse control. Automatic coupling and uncoupling. Roller contacts on rails. 10 feet oval of strong 2-rail Track. Four U.2 type Batteries give long trouble-free runs. Batteries 2/- extra.

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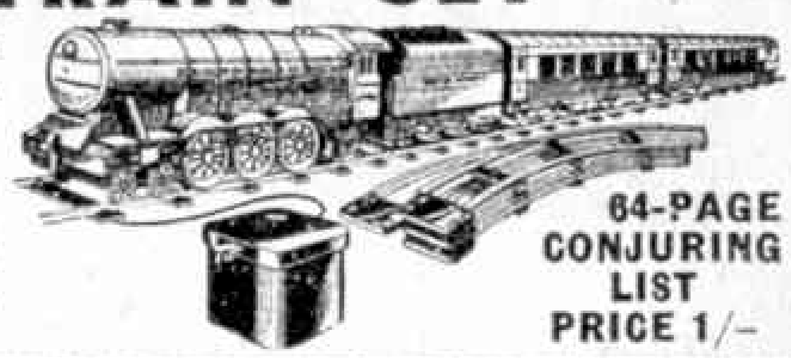

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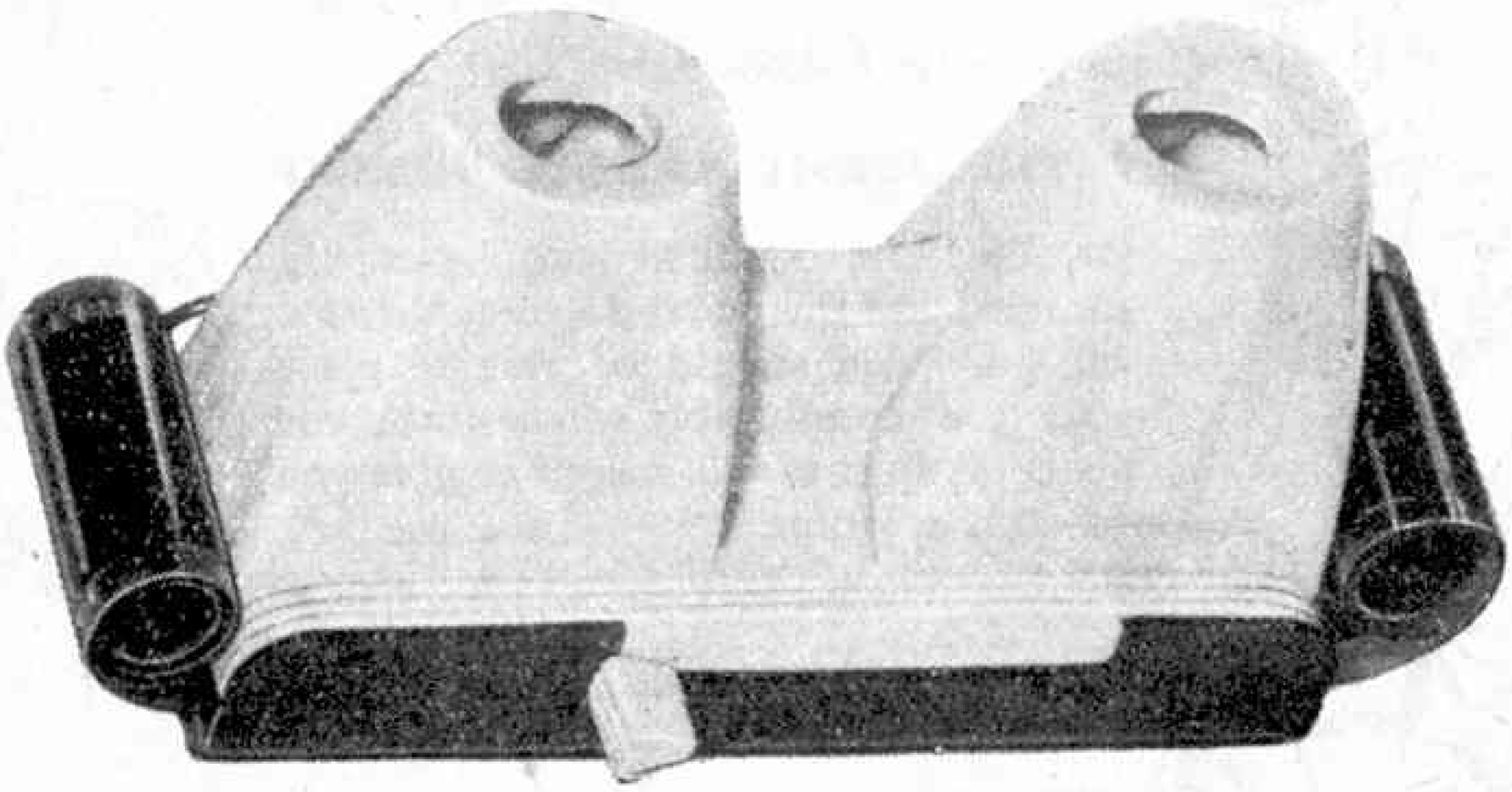
'Visit' the Festival of Britain
through the
S.E.L. True-View Stereoscope!



The Festival in Vivid Reality!

The latest additions to the library of film-strips for the S.E.L. True-View Stereoscope illustrate in beautiful three-dimensional reality "The South Bank Exhibition" (three strips) and "The Pleasure Gardens, Battersea Park." Beautifully moulded in cream and brown, the Stereoscope costs **18/6** complete with two film-strips, "London Scenes" and "Scottish Beauty Spots," each film-strip containing 14 specially photographed views. Other film-strips available at **2/6** each are "The West Country," "Sussex and Surrey," "The Wye Valley," "The Lake District," "Canterbury," "The Burns Country," "Dorset," "Rural Kent," "The Border Country," "Picturesque English Villages," "The Highland Line (Perthshire and Angus)," "The Scottish Highlands" and "Lowland Grandeur."

Many other film-strips in preparation.

See the 'True-View' Stereoscope and the Festival film-strips at your dealer's

Send postcard for Illustrated List of all S.E.L. Products to

SIGNALLING EQUIPMENT LTD

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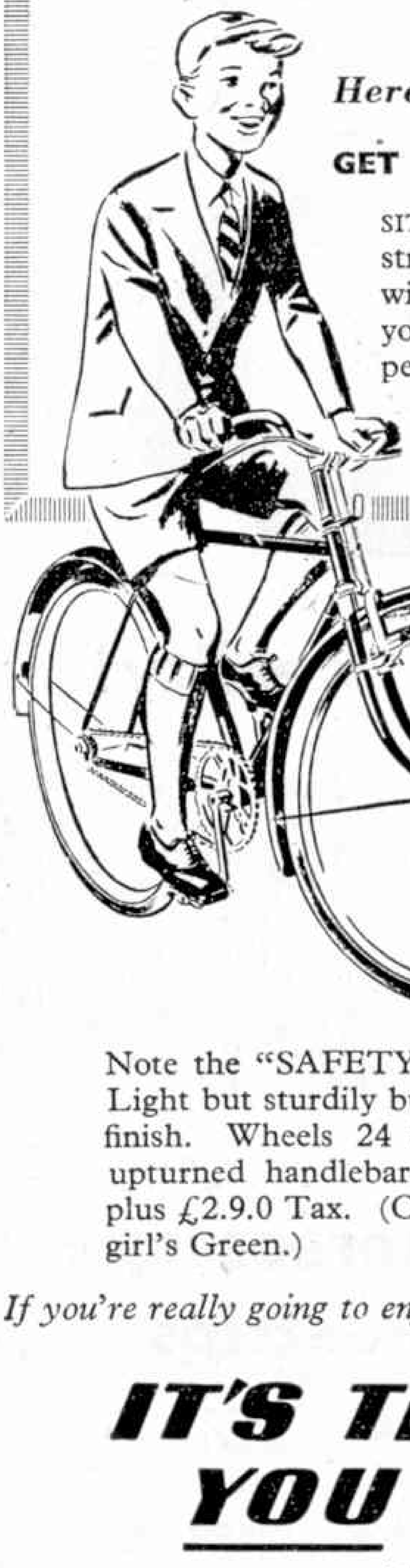
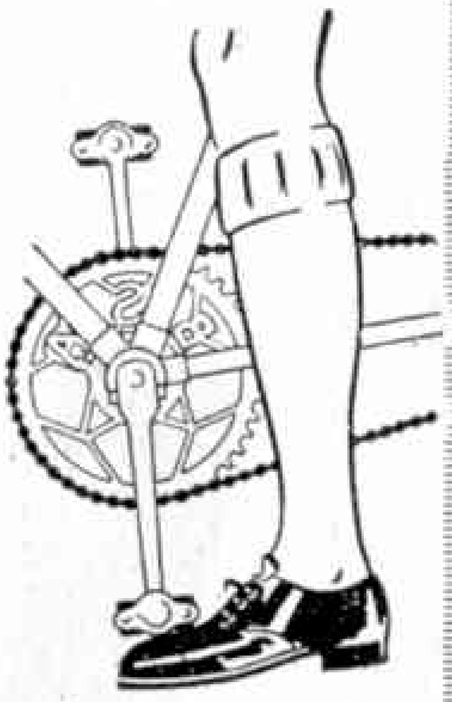


Here's one important test

GET THE RIGHT SADDLE HEIGHT

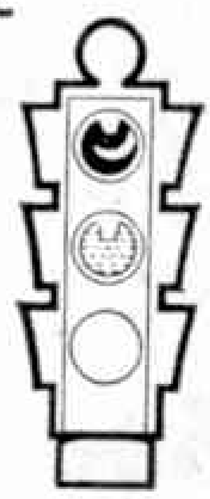
SIT ON THE SADDLE with your leg straight, and the pedal down as far as it will go. You should be able to place your toe comfortably *underneath* the pedal. Adjust saddle height to give you this position.



BSA

JUNIOR ROADSTER

SAFETY MODEL



Note the "SAFETY MODEL" transfer on the seat tube! Light but sturdily built 18 in. frame. Black and chromium finish. Wheels 24 in. Dunlop tyres. Chromium-plated, upturned handlebar. Roller lever brakes. Price £10.10.0 plus £2.9.0 Tax. (Colour finish extra—boy's Windsor Red, girl's Green.)

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MECCANO MAGAZINE

Editorial Office:
Binns Road
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England

Vol. XXXVI
No. 10
October 1951

With the Editor

A Toadstool Legend

The article on the photography of toadstools on page 457 of this issue arouses many interesting memories. In it Mr. Steele points out that while many toadstools can be eaten with safety a few are poisonous. This takes my mind back to stories I heard when I was a boy about the way in which a poisonous toadstool can be distinguished from one that can be eaten with safety.

One test that I was assured was absolutely reliable was that if the top skin could be peeled easily then the toadstool was harmless, although possibly not very appetising. I never put this test to any use, and perhaps this was a lucky escape for me, as some years later I learned that the most dangerous of all British toadstools, a deadly poisonous one, can be peeled as easily as a mushroom!

Other tests, such as seeing if the fungus can turn a silver spoon black while it is being cooked, do not seem to be any more reliable than the peeling one. However tempted we may be by the innocent appearance or attractive colour of toadstools the best plan therefore is to leave them severely alone, and to be content with the well-known mushroom.

There are other interesting features of the fungus family, to which the toadstool belongs. One concerns the rings of fungi that can often be seen growing in fields. It seems remarkable that these plants should form such splendid circles, but the explanation is quite simple. Unlike ordinary green plants, toadstools and other fungi cannot take up carbon dioxide from the air, but must find nourishment underground. When new growths are formed from existing ones only those flourish that bud on the outside of the old growth, for the ground already covered is exhausted. This marks the beginning of a ring, which grows in size, new plants on the outer side finding sufficient food in the ground and those formed on the inner side of the ring starving and dying off.

This scientific explanation lacks the romance of the one I was given as a boy, which makes the rings magic ones associated with the dances of fairies by moonlight, particularly on the night of the 1st of May. Some of these fairy rings must be three or four centuries old.

* * * *

Our cover this month, based on an attractive photograph by Mr. E. E. Steele, of Fiskerton, shows a picturesque view of Monsal Dale viaduct in Derbyshire. See the article on page 438.

This Month's Special Articles

	Page
Petrol Round the World ..	434
Australian Motor Coasters by Denis Rebbeck, M.A., M.Sc.	437
By Midland to Manchester by "North Western"	438
Civil Engineering Construction in a New Town by Stanley J. Asher, A.M.I.C.E.	442
Introducing the Pack Plane by John W. R. Taylor	448
East Anglian Dock Railway Working by M. H. Solomon	452
How Things are Made—Plastic Lenses by W. H. Owens	454
The Scrapping of Locomotives by "Shed Superintendent"	460

Petrol Round the World

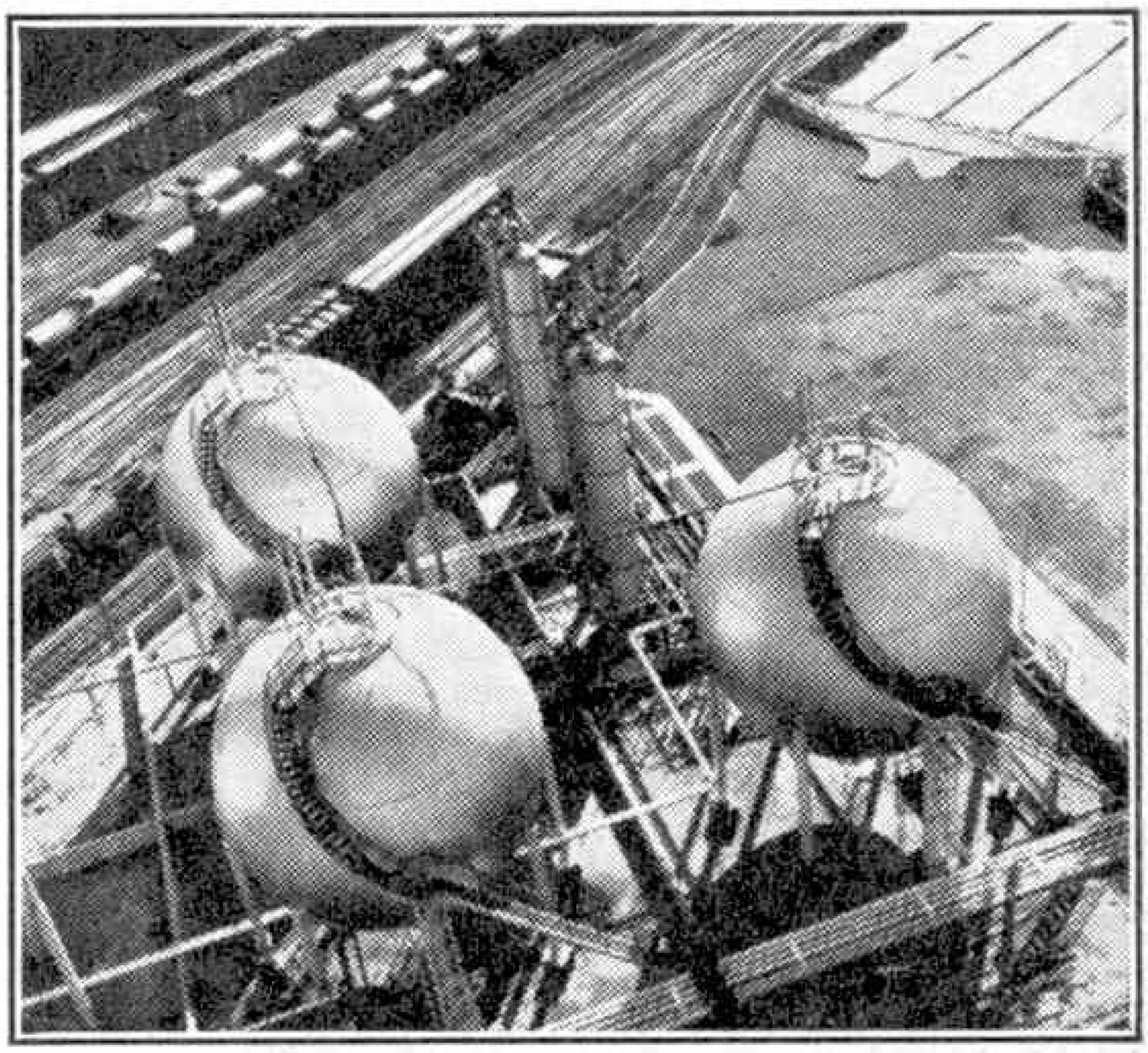
From Oil Well to the Consumer

EVERY year the world uses about 500 million tons of petrol and other products made from crude oil brought up from the depths of the earth. These products vary widely in character, ranging from aviation spirit and petrol to lubricants and bitumen; and bringing the required products in sufficient quantities to the right places at the right times is a difficult problem, the solution of which requires a high degree of organisation.

It is less than a century since the oil industry began, and as it became more extensive and important a very elaborate system of distribution grew up with it. Methods of sending oil and oil products around the world have continually been made more efficient and to-day they are carried swiftly and easily to filling stations, factories and other places where they are required.

The movement of all these products begins at the wells where the crude oil is produced. The earliest idea was to use barrels to contain the liquids. Filling these and handling them took up considerable time, and it was impossible to avoid serious loss by leakage. Apart from that, the barrels added greatly to the weight transported, by ship, train or road. To-day these containers are used mainly for greases and bitumen. For all other products bulk transport in various forms has been brought into play, and even bitumen, which normally does not flow, is now distributed in bulk in specially constructed vehicles to which heat can be applied so that it can readily be discharged.

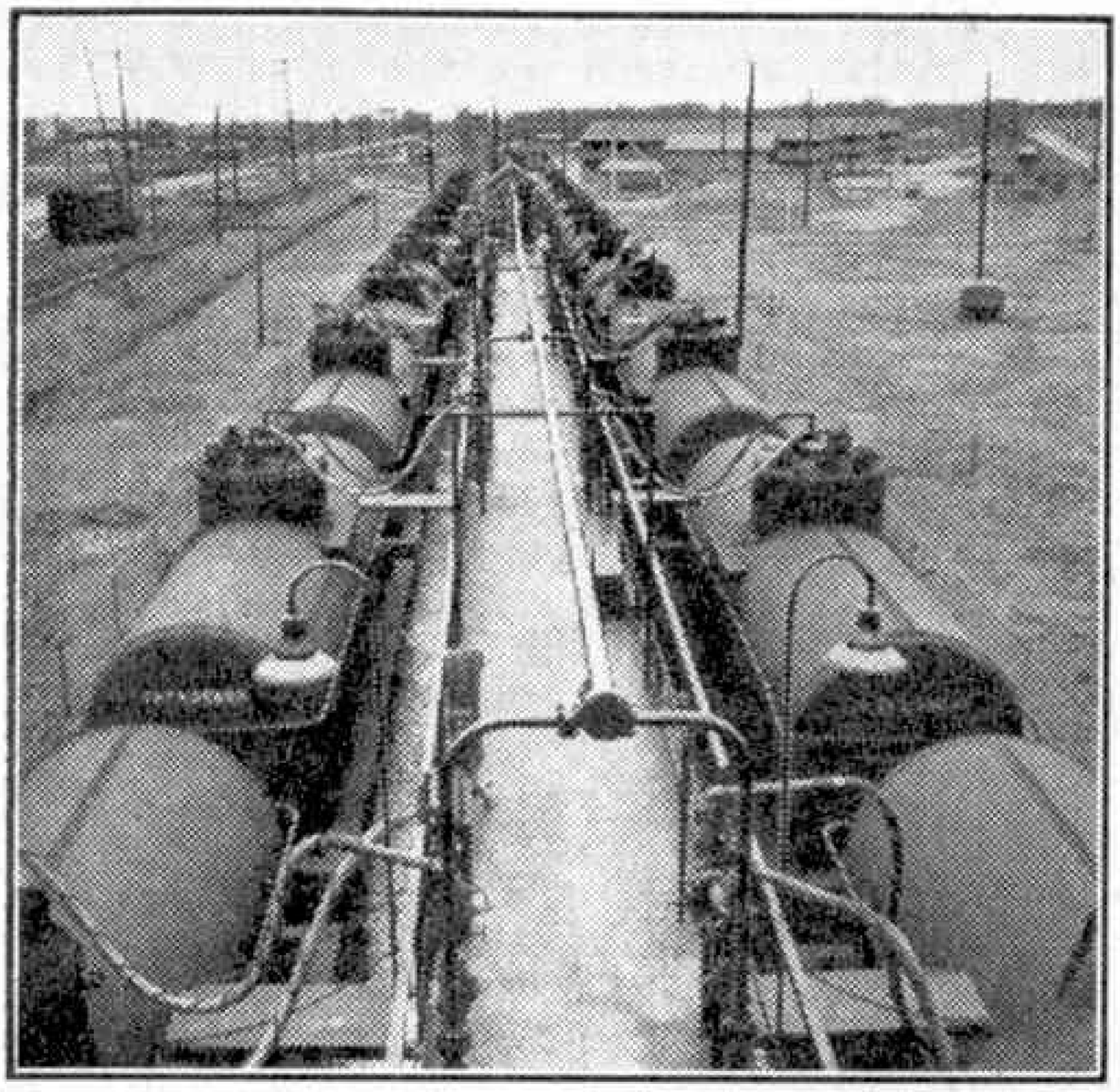
In one form of bulk transport the pipeline is used. This applies particularly in the oil fields themselves, where nowadays pipelines carry the precious crude oil to the refineries or to ports for shipment overseas. In the United States pipelines are used on a large scale for carrying petrol and other products from the refinery areas to some of the most important centres in which these are used. For a time a similar system was employed in Great Britain. This was during the war, when large quantities of petrol from our West Coast ports were sent through pipelines to fill the tanks of aircraft at stations in East Anglia, and to the south of England for the use generally of the Allied Forces there and on the Continent. These pipeline systems were of the greatest value in the war effort, but in peacetime conditions they are not economical and they are not now employed.



Part of the oil refinery at Baltimore, in the United States. The spherical tanks contain the gas propane under pressure. The illustrations to this article are reproduced by courtesy of the Petroleum Information Bureau.

This wartime British pipeline system was actually extended under the waters of the English Channel to the Continent. The project, known as PLUTO, was a spectacular feat of engineering, in which 21 separate lines were laid. Two types of pipe were used. These were a hollow lead cable, laid by specially fitted ships, and a more flexible steel pipe. The latter was wound round giant floating drums, which carried about 70 miles of pipe when fully loaded. The drums were towed across the Channel, unrolling their lengths of piping as they moved.

An interesting feature of the use of pipelines in the United States is that



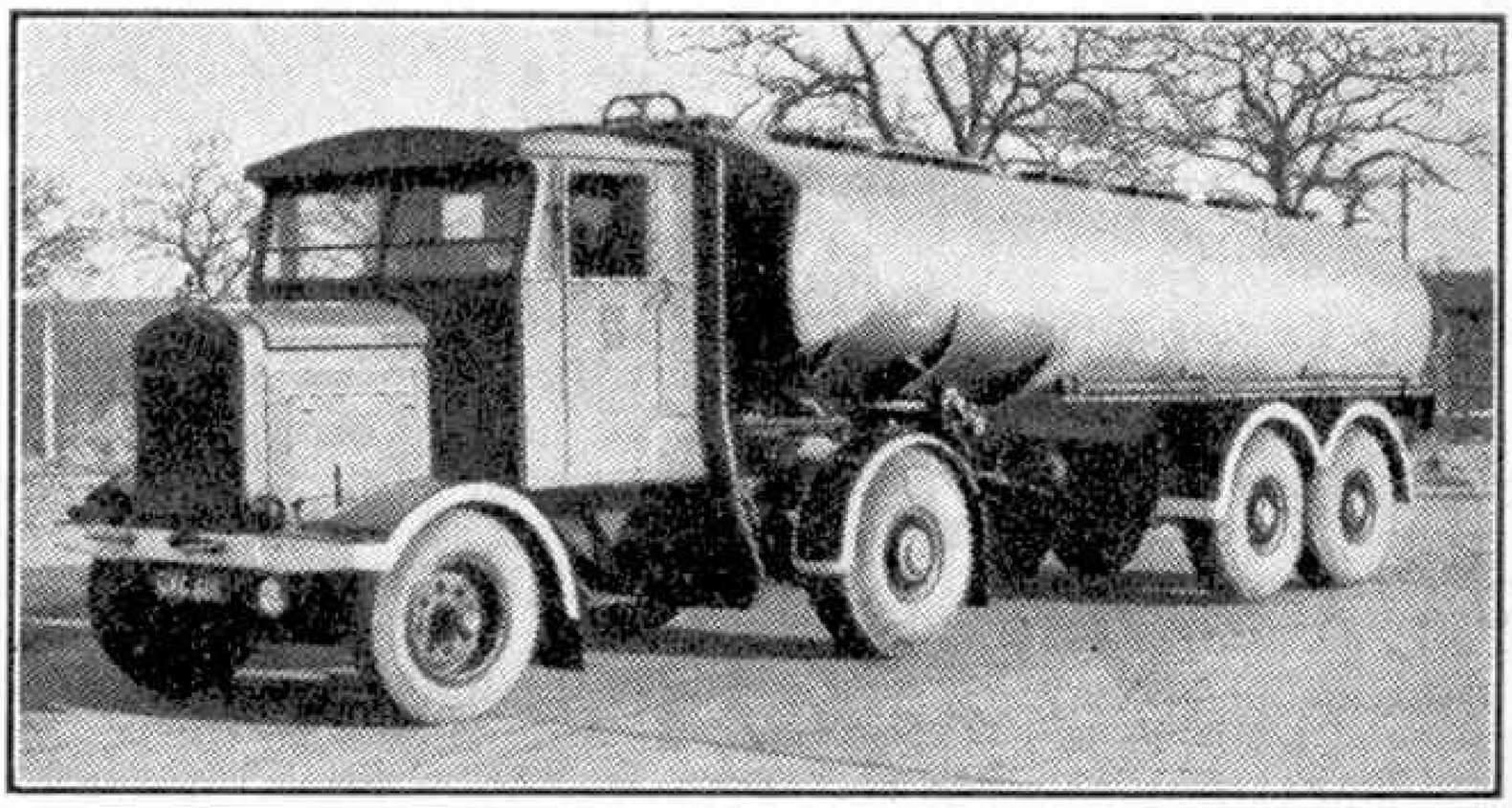
Loading tank cars at works in Baytown, Texas.

except for crude oil, it is not necessary to restrict the use of any particular pipeline to one product. For instance, a pipeline extending from an oil refinery at Wood River, Illinois, eastward to Lima and Columbus, Ohio, actually handles 22 different finished petroleum products, pumped through one after the other. There is practically no mixing, and movement is controlled by dialling code numbers on a telephone dial 850 miles away in New York. These signals start and stop pumps in the four pumping stations along the line, and open and shut the valves; while meters at the stations report back the various pressures whenever the information is required in New York.

The sea-going tanker is nowadays a familiar sight, and it plays an enormous part in the transport of crude oil and of refined products of various kinds throughout the world. The world's tanker fleet is continually growing, as is shown by the tanker building programmes of two major oil groups, announced early this year, which involve a total expenditure of about £70 million, mostly in British shipyards. On land, road and rail wagons are used. Road vehicles for local deliveries of petroleum products in Great Britain may not exceed 3,600 gallons, or about 12 tons, in capacity. A fine example of a road tanker of this size is the eight-wheeled Scammell articulated vehicle shown in our lower illustration on this page. Many of the road tanks actually employed are considerably smaller than this attractive giant. Rail tank cars are larger. In Great Britain these are usually from 10 to 20 tons in capacity, but in some countries they may hold as much as 50 tons.

It is interesting to find that very large quantities of petroleum products are carried on our waterways in tank barges ranging in size from small 30-tonners to large vessels with a capacity of 1,000 tons. Coastal tankers also play a great part in the distribution of oil products. These vary in capacity from 300 tons to about 3,500 tons, and they differ from the large ocean-going tanker only in size.

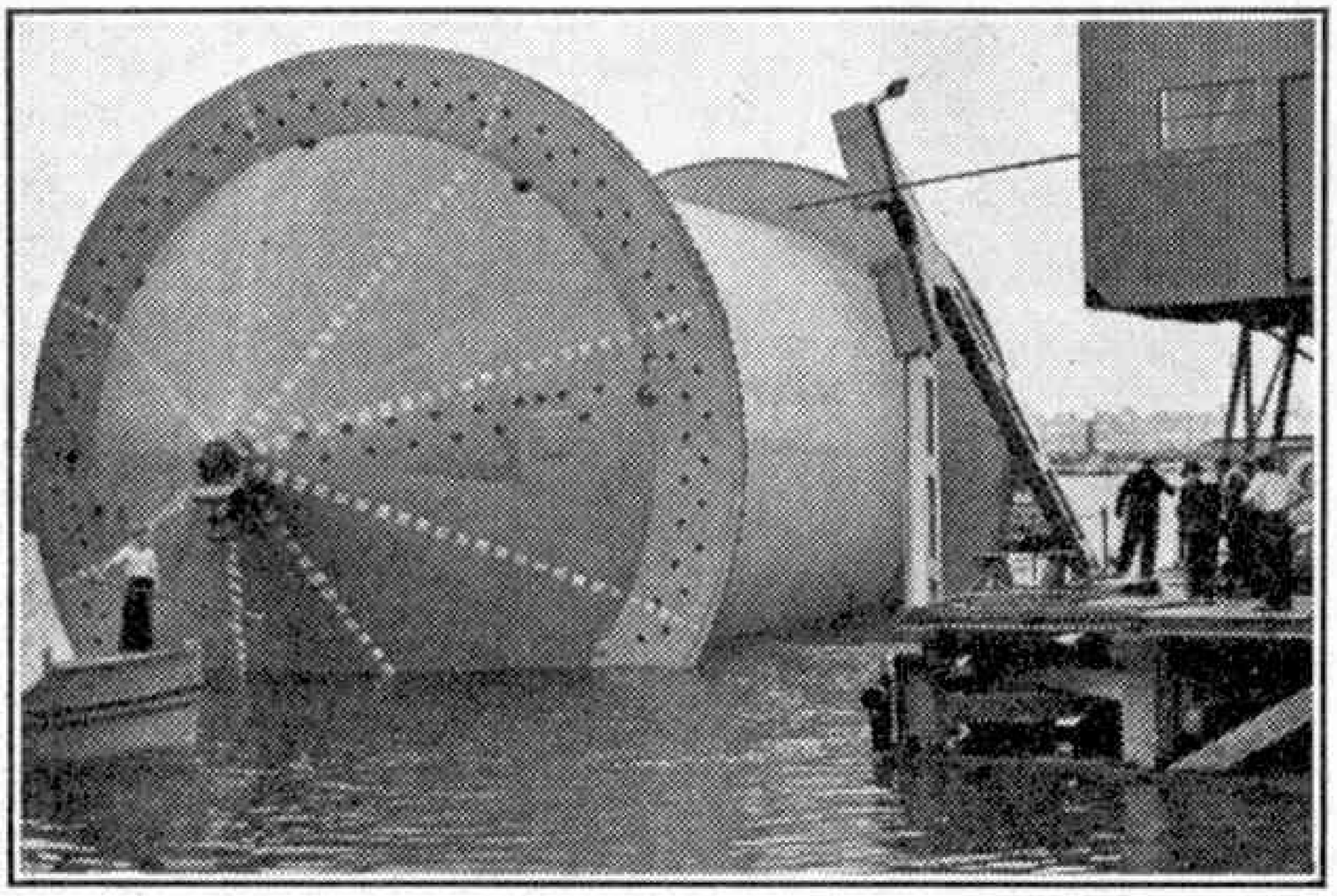
Petrol and other liquids yielded by crude oil require storage at various points on their way from the oil well or refinery to the consumer, and so the storage tank occupies an important place in the long chain. The normal tank is an upright cylinder, made of riveted or welded mild steel plates, which in some tanks may be as much as an inch in thickness. The capacities of main storage tanks range from about 12,000 gallons upward, and the largest, which hold more than 4,000,000 gallons, are as big as medium size concert halls. All are comparatively simple to fit. In normal soil the only foundation required is of built up earth, which is



A Scammell eight-wheeled road tanker. This articulated vehicle has a tank capacity of 3,000 gallons, the maximum in Great Britain for road tankers.

covered with sand and topped by a 2 in. layer of a mixture of sand and bitumen.

All these tanks have standard pipe connections for filling and drainage, with additional connections for use when blending is to be carried out. Fuel and lubricating oil tanks have very simple roof fittings, with dipholes through which



One of the giant drums on which pipes for Pluto, the pipeline under the English Channel, were wound in preparation for laying them underwater.

to measure the amount of liquid in them and manholes to allow for entry for cleaning and repairs. In tanks used to store petrol, which is more volatile, the dipholes are made gas tight and there are escape valves to allow the tank to "breathe," drawing air in when the temperature falls and expelling air and vapour when it rises.

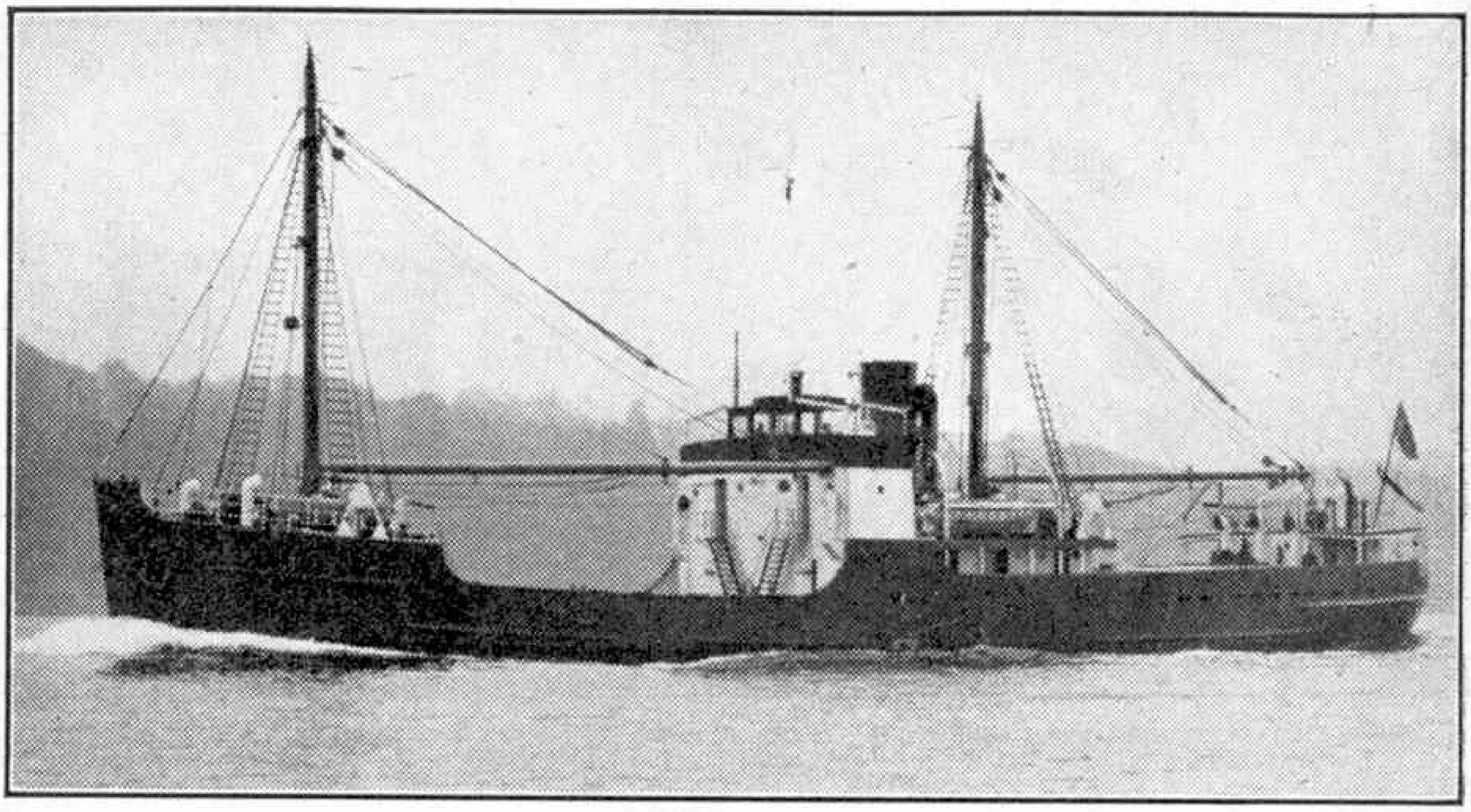
Breathing results in loss of the products stored, so various measures are taken to reduce this. One way is to lag the roof in order to avoid changes of temperature as far as possible. Another is to paint it aluminium, so that the Sun's rays are reflected from it, and their heating effect is reduced. Some tanks actually have roofs that float on the surface of the liquid in them, leaving no space; these tanks do not breathe at all, but they are costly to build.

Even gases derived from crude oil, such as propane and butane, are stored in tanks, but these are of special shapes. For storage at pressures up to 25 lb. per sq. in. above that of the atmosphere a slightly flattened sphere or globe is used, and is known as a hortonspheroid. Gases at higher pressures up to 100 lb. per sq. in. are stored in round tanks called hortonspheres, shaped like giant footballs. Propane tanks at Baltimore in the United States are seen in the illustration on page 434, and similar gas tanks at Stanlow, Ellesmere Port, Cheshire, were shown in *"Engineering News"* in the October 1950 *"M.M."*

Fire is the enemy most greatly to be feared at all oil installations, and special precautions are taken to reduce the risk and to fight an outbreak if one occurs. "No Smoking" is an absolute rule, and even the possibility of an electric spark is avoided by making sure that all road and rail cars are so built that they are efficiently earthed. One interesting way of restricting damage is to fit only very light roofs to the tanks and to attach them loosely. These act as safety valves. If there is an explosion, which almost always is the case before a fire, the roof is blown off. The oil then burns steadily and the sides of the tank gradually curl in the heat and collapse inward, so that the fire is usually restricted to a single tank. Part of the contents of a blazing tank may even be drawn off from the bottom and salvaged, for the burning takes place only at the top, where there is sufficient air. In addition the tanks in an oil storage installation are usually surrounded by walls of earth, brick or concrete, enclosing a space large enough to contain easily the contents of the largest tank in the group in emergency.

For actual fire fighting sand and chemical extinguishers usually are sufficient, but at main installations there is a system of water lines, which can be used not only to fight the actual fire, but also to keep neighbouring tanks cool by spraying. At refineries the equipment includes also tanks containing chemical solutions, connected to an elaborate system of pumps and pipelines.

The end of the distribution chain brings the oil to the actual user. Those making use of oil or petrol on a large scale for power and other purposes store it in their own tanks, and for motorists and road users generally it finds its way into the tanks of garages and roadside filling stations. It is (*Continued on page 478*)



Australian Motor Coasters

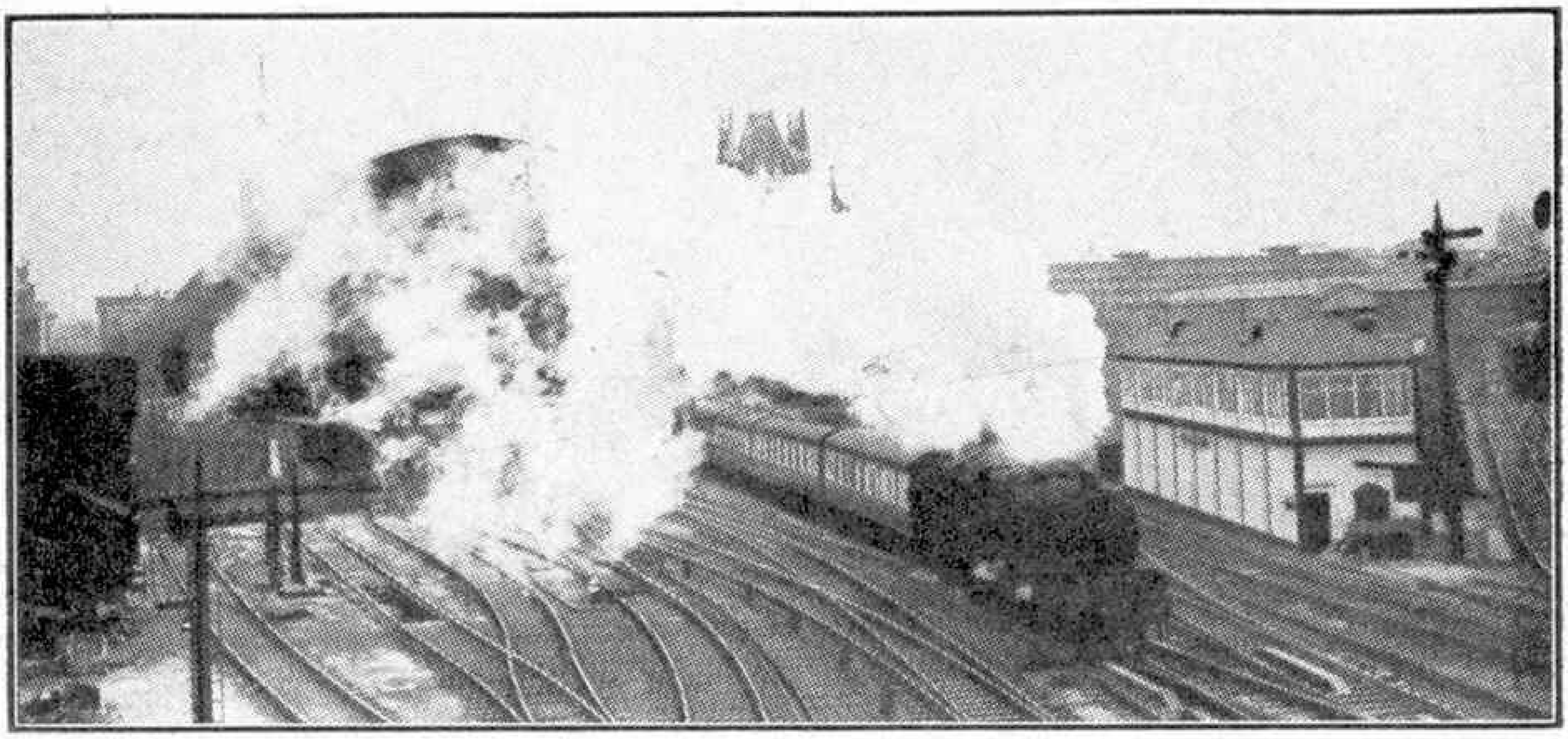
By Denis Rebbeck, M.A., Ph.D., M.Sc., B.Litt., M.I.N.A.

COASTING vessels form a very important link in the chain of sea commerce. It will be appreciated that a large country like Australia, which has comparatively poorly developed inland transport, and whose cities all lie in the coastal regions, lends itself particularly to coasting traffic. Coasters in Australian waters are often British built, and many fine examples have gone out to the distant shores of Australia from the Old Country.

Typical coaster-owning companies in that part of the world are the Adelaide Steamship Company Ltd. of Adelaide, and the North Coast Steam Navigation Company of Sydney, and the little ships are all specially designed for the trade for which they will cater. There are naturally vaious alternative arrangements of holds, hatches and derricks, but the illustration on this page may be taken as a typical example of one of these stout little vessels.

The vessel illustrated was built for the North Coast Steam Navigation Company of Sydney and is named the *"Comara."* She was built by Harland and Wolff Ltd. in their Govan Shipyard, and was handed over to her owners early in 1937, which means that she has now 14 useful years of sevice to her credit. The *"Comara"* is a single deck vessel of 751 gross tons. She is capable of a speed of 10 knots, being driven by a six cylinder single acting two cycle diesel engine of Harland-B. and W. design having a cylinder bore of 280 mms. and stroke of 500 mms. The engine develops 720 indicated horse power and the dimensions of the hull are: Length 173 ft. b.p., moulded beam 35.6 ft. and moulded depth 9.1 ft.

As one would expect, these Australian coasters vary in overall dimensions, power and equipment to suit the requirements of the various owners. Some of the vessels for example have only one large hold served by a large hatch, but they too have a refrigerated space for the transport of butter. Such an insulated space for the carriage of butter is a feature of nearly all these craft. Some of them may be only 160 ft. in length overall with a deadweight capacity of some 450 tons; while others are very much larger, being 350 ft. in length and having a deadweight capacity of 5,000 tons. The latter is of course really a cargo motorship rather than a mere coaster, although her life will be spent trading on the Australian coast. These little vessels play an important part in the home trade of Australian shipping and are an interesting and certainly a very useful type of merchant ship. In many respects they are, as they have aptly been described, "Big little ships."



A London Midland express leaving St. Pancras. Typical Midland signals can be seen on each side of this picture. The illustrations on this and the following page are from British Railways Official Photographs.

By Midland to Manchester

By "North Western"

AS a youngster I counted myself fortunate to be taken from London to Manchester by the Midland Railway. The neat and tidy St. Pancras Station, the 12 noon train with its trim engine and coaches all in their crimson livery, the characteristic signals and picturesque run through the Peak, all helped to impress that journey on my mind. Actually, the trip was made right at the beginning of the great blizzard of March 1916, so that the views through snow-covered Derbyshire were even more striking than usual. *"Travel by the Midland for choice"* the posters used to say; I often wanted to again, but the opportunity did not present itself for quite a long time.

Midland penetration to Manchester was a typical step in the policy of expansion followed by that company in spite of the opposition of competitors, and other difficulties. The Midland Railway, which later was to form part of the L.M.S., and which is now part of British Railways, was itself the product of the amalgamation in 1844 of the Midland Counties, the North Midland and the Birmingham and Derby Junction. Anxious to reach busy Manchester, the Midland had in 1846 become partner with the Manchester and Crewe line in projecting a route from Stockport on the latter to Ambergate, to which point the line from Derby had been opened by the North Midland in 1840. This scheme fell through because in July 1846 the Manchester and Crewe was involved in the amalgamation that produced the L.N.W.R., which was against the Midland having access to the Cotton Capital. So the scheme resolved itself into a line from Ambergate to Rowsley, which was opened in 1849. However, the extension north from Rowsley was sanctioned in 1860 in spite of fierce opposition from the L.N.W.R., and from the Great Northern, and the Manchester, Sheffield and Lincolnshire Railway, for those were the days of strenuous competition between rival companies.

Construction began from Rowsley to Buxton, and then an Act for an extension to New Mills in order to use the M.S. and L. route into London Road, Manchester, was obtained in 1862. The line to New Mills was opened in 1866, at first for goods traffic only. This had to be suspended because of extensive land movements at Bugsworth (now known as Buxworth) viaduct, caused by exceptionally heavy rainfall. The whole of the viaduct was swept away out of the course of the line, and a new timber viaduct was then constructed, which permitted all traffic to pass over it, in 1867.

As yet the Midland had no route of its own to London, although its trains reached there, first via Leicester and

Rugby to Euston, and then from 1857 via Hitchin over the Great Northern into King's Cross. Neither arrangement was really satisfactory, and so an important step in the Midland policy of expansion was the planning and completion of its route via Bedford into St. Pancras, which was opened in 1868. In 1880 Midland trains began to use the Cheshire Lines Central Station in Manchester, and this is the terminus of the Manchester services from St. Pancras to-day.

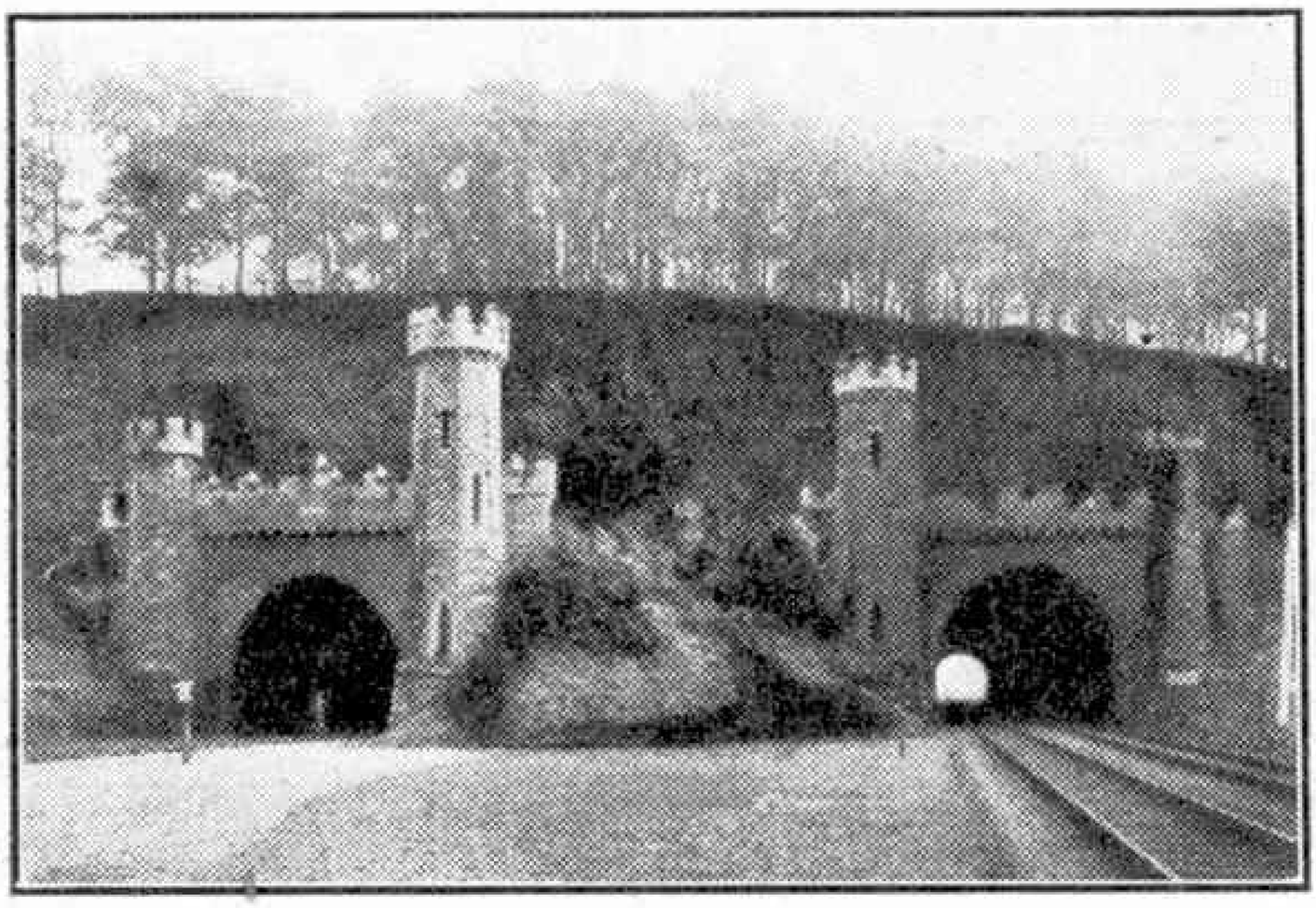
A somewhat startling Midland development in 1904 was the institution of a schedule for the journey of 3 hr. 35 min., with one stop in each direction, by certain trains. This did not last very long, although the same overall timing was applied by the L.M.S. in 1937 to the 10.30 a.m. down, appropriately named in 1938 "*The Peak Express.*" This was then the fastest train of the day between St. Pancras and Manchester.

If present-day schedules are not spectacular, the Midland route has lost none of its attractiveness. On a typical journey now from St. Pancras to Manchester by the 10.15 a.m., the present-day counterpart of the "*Peak Express,*" we find a long train of some twelve vehicles in place of the light formations of Midland days. The crimson and cream B.R. livery of the coaches is in striking contrast to the Derby red of former times. Again, our engine is a 4-6-0, a type unknown on the line in the Midland period. In fact not until the L.M.S. completed an extensive bridge strengthening programme did heavier power begin to seriously replace the gallant 4–4–0s of the Midland regime.

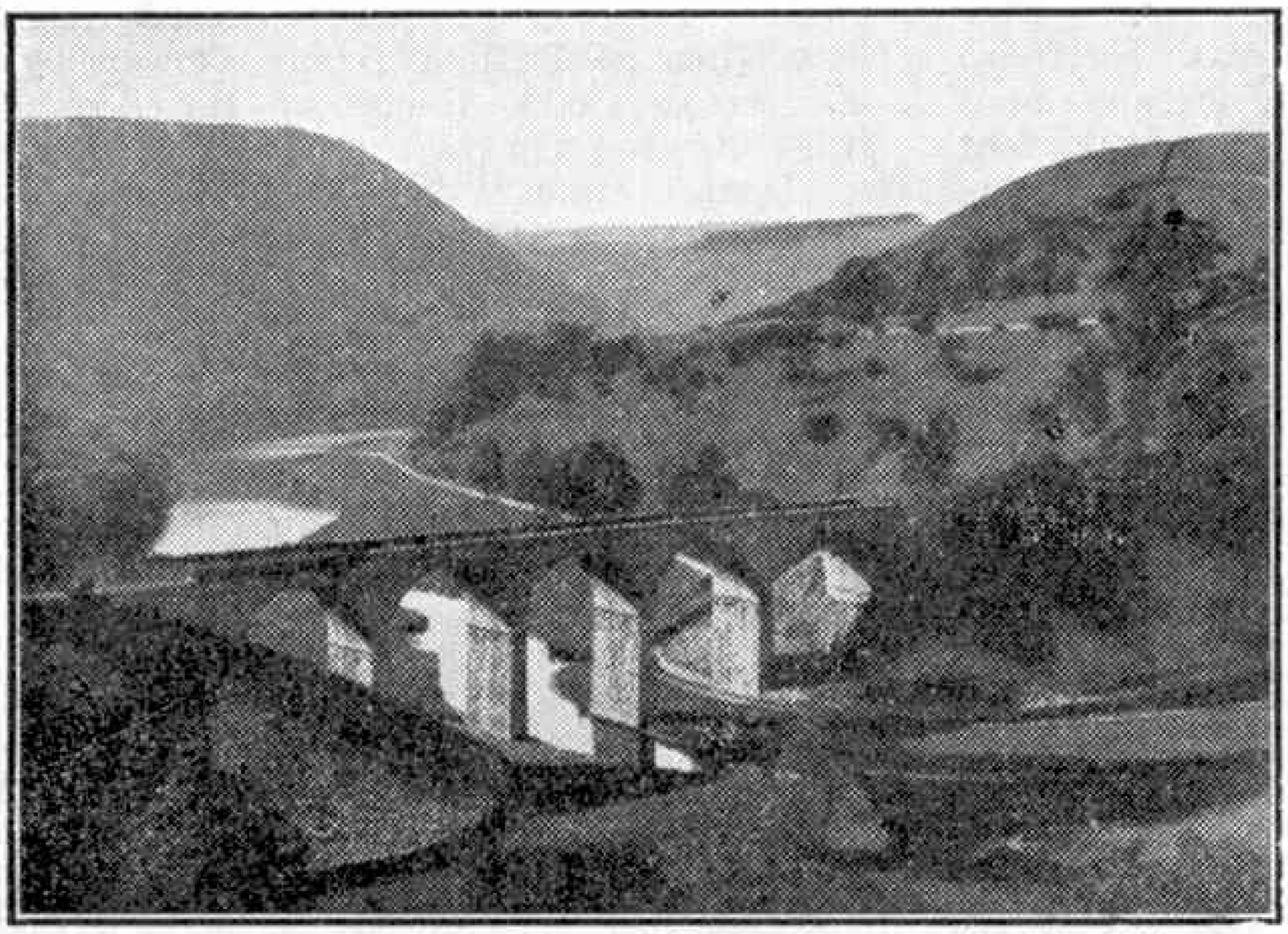
No. 45648 "Wemyss," a three-cylinder 4-6-0 of the "Jubilee" class responsible for much of the express work on the Midland main line. The engine is in B.R. green livery with the Lion and Wheel emblem on the tender.

The 4–6–0 "Jubilees" and the familiar Class 5 "Black Staniers" have now been the principal long-distance engines over former Midland routes for some time. They have to work fairly hard because trains are heavy nowadays and the Midland is a difficult route. Manchester trains have to negotiate the stiff climb to Peak Forest, 980 ft. above sea level, in the course of the journey.

Making a good start from under the great single-span roof of St. Pancras, where the trains live as it were in the attic, our train forges steadily through the suburbs. Cricklewood and busy Brent sidings, Elstree tunnel, St. Albans, and Luton with its various industries bring us out to mile-post 34 beyond Leagrave. Here in a cutting with a chalky formation, like that of Tring on the Euston route, we finish with the final stage of the climb out of London.



Redhill tunnels just south of Trent Junction. The tunnel on the left was constructed at a later date than the other but the architecture of the tunnel face was designed to match that of the original bore.

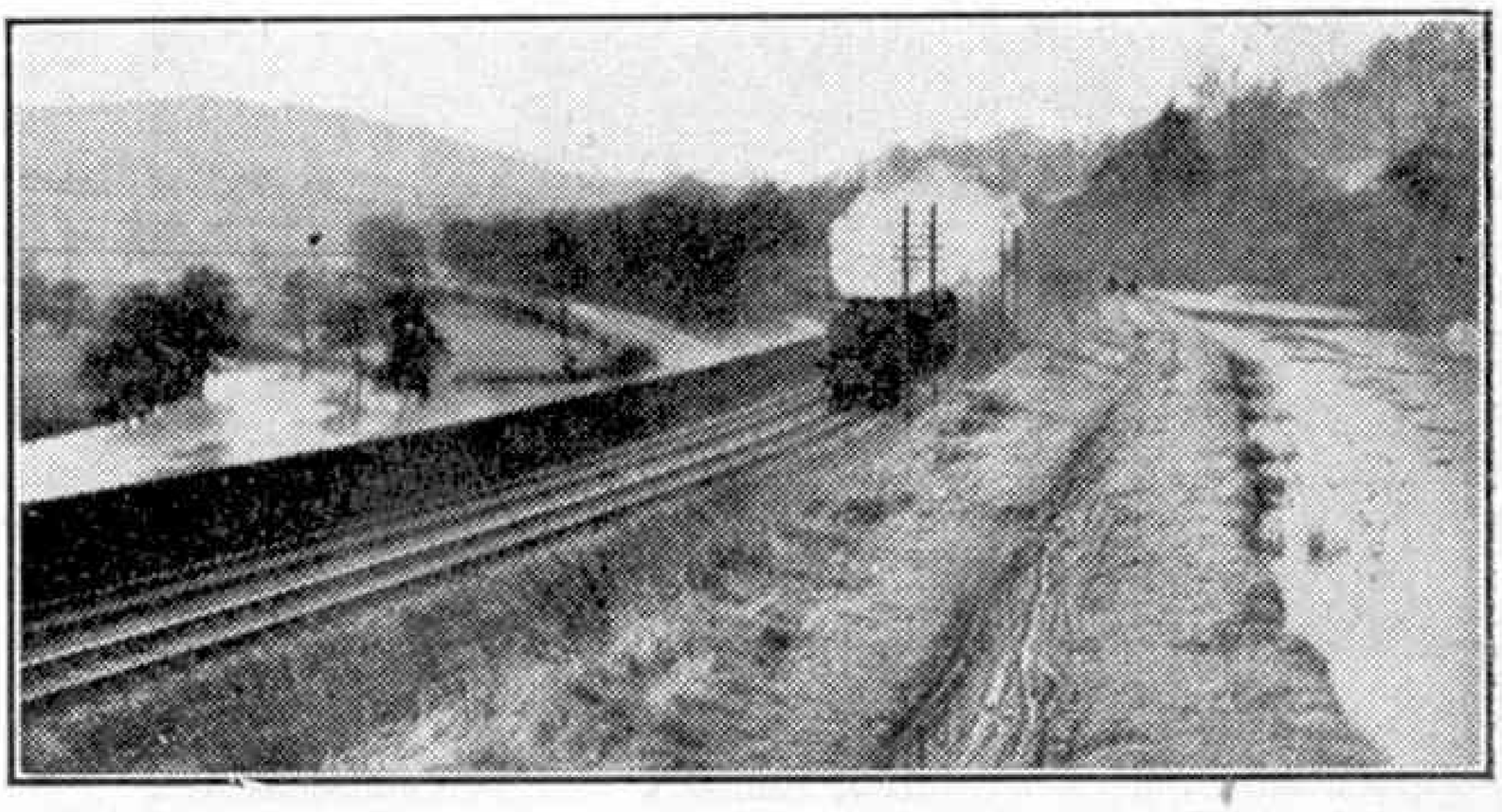


Monsal Dale viaduct in Midland days. This structure over the River Wye was strengthened by the L.M.S. British Railways Official Photograph.

Now we really begin to move, past Flitwick, and Ampthill where the freight lines normally alongside us take a slightly different location. After Bedford where the main lines avoid the station we come to Oakley Troughs and then have the toilsome ascent past Sharnbrook to deal with. Sharnbrook is 340 ft. above sea level and some 3¾ miles of the bank are inclined at 1 in 119. Here our engine feels the pull, while the goods lines, for easier working, again leave us to follow a separate route through Sharnbrook tunnel. We are running well again by the time they rejoin us at Irchester South. After Irchester Junction and viaduct we come curving round through Wellingborough, an an important traffic centre and home of freight engines. Climbing again we pass Kettering, and then Glendon South Junction brings to an end the longest four-track stretch in the country, over which we have been travelling. Here the Nottingham route separates from ours and we proceed on double track railway only. After Desborough the line falls again to Market Harborough and climbs to Kibworth; and so easing through Wigston, and then its junctions, we come to Leicester, just over 99 miles from London.

From Leicester the next stage to Derby is an easy one with level or moderate grades only. We stop at Loughborough; then come more water troughs and soon we find Redhill Tunnel is but a short one. Suddenly, on leaving it, we are crossing the Trent to enter Derbyshire. We avoid Trent station, heading left at Trent junction box, and make for Derby, our next stop.

Beyond Derby comes the choicest part of the journey, where the building of the railway, on a ledge of rock in places, must have been an extremely difficult task. The character of the country is such that railway, road and river are nowhere far apart for many miles, and over one stretch these three transport ways are accompanied by a canal as well for good measure. Low hills greet us first; then with the first of many tunnels, Milford, we meet the stone-wall country and characteristic dale scenery. The tendency of the road is upward, gently at first as far as Ambergate, where the hills grow bigger and nearer, and we ease carefully round the left-hand curve of this triangular junction. Cromford is followed by a tunnel, and railway, road and river are enclosed by the steep (*Continued on page 478*)



Four ways of transport parallel to one another in this photograph by Frank Rogers, Derby. The Cromford canal, the railway and road and the river are in close company.

BOOKS TO READ

Here we review books of interest and of use to readers of the "M.M." With certain exceptions, which will be indicated, these should be ordered through a bookseller.

"YOUR BRITISH RAILWAYS"

(The Railway Executive. 2/–)

The object of this 48-page official British Railways publication is to reveal something of the complex organisation behind familiar railway features that are so often taken for granted. Its pages are of generous size, displaying a large number of well-reproduced illustrations showing many aspects of railway work.

Engines and enginemen at work, carriages, wagons, permanent way and signals are all featured, as well as lesser-known items of equipment, and the people who work them and look after them receive full recognition. The making up of trains, both passenger and freight, and the many-sided activities involved in freight traffic all find a place. There is a particularly interesting series of shots in connection with the sorting and exchange of mails. The marine interests of British Railways are not neglected, and there is a double-page sectional view showing the inner workings of the new standard "Pacific." Unusually for a publication of this nature, but most usefully, there is an index.

The book is on sale at railway station bookstalls; everyone interested in railways should endeavour to obtain a copy.

"HOME PHOTOGRAPHY"

By A. R. Pippard, B.Sc., and K. P. Macdonnell (2/6)

This attractive and practical booklet on photography should be found very useful indeed by all who enjoy this wonderful hobby. Of the two authors, one is a scientist and the other a practical photographer, and between them they cover the whole ground from taking a photograph to producing a finished print, and this is done in a manner that will be appreciated by owners of small box cameras and also by those possessing more elaborate equipment.

The first part of the book deals with taking the picture and gives good advice on portraiture, landscape work and action photography. The beginner is urged to read more about the particular branch that interests him most, but this introduction will take him a long way, for it is concerned with the choice of film, filters, tripods, stops, lenses and exposures, with lighting for portrait work indoors. The second half is devoted to developing and printing. The practical character of the book is particularly evident here, and with it as a guide no one need hesitate to embark upon work of this kind for himself, and also to make a beginning with enlarging.

The book is copiously illustrated. It is sold at 2/6 and can be obtained from a photographic dealer, or post free from Johnsons of Hendon Ltd., 335, Hendon Way, London N.W.4.

"SNOWDON MOUNTAIN RAILWAY"

By O. J. Morris (Ian Allan Ltd. 2/6)

In this readable account of the only rack railway in Britain, the Snowdon Mountain Railway, there are five sections. The first deals with the situation and general history of the line, and is followed by one giving an interesting general account of the rack system and its development in various countries. The Snowdon locomotives, which are of the specialised kind evolved for rack railway duties by Swiss builders, are then described. The rolling stock and its possible future development are next considered, and lastly the reader is taken on a typical Snowdon journey.

Interesting illustrations are a feature of the book and there are diagrams showing gradient profiles, curves and track layouts. The rack system itself is demonstrated by useful sketches.

"SPOTTING BRITISH BIRDS"

By S. Vere Benson, M.B.O.U.

(Warne. 17/6)

Most of us are always ready to enjoy a book such as this, with its many full page pictures showing our birds at home or searching for food, and its wealth of interesting drawings. These are full of the special charm of bird life, but they also are intended to help new bird watchers to identify the familiar birds of our countryside and gardens. Descriptions of these are given in the text, which is specially written to aid in the recognition of birds, but at the same time provides more advanced watchers with first-hand notes and hints that will assist them in studying the birds of the moors, and of the more lonely rocks and islands around our coasts.

The author is the founder and Honorary Secretary of the Bird Lovers League, and his story is the result of personal observations made during patient study over many years. He has contributed the many line drawings in the text, and the fine full page illustrations are reproductions of photographs by Eric J. Hosking and other famous naturalists. A list of British birds is given, with their family classification, and an interesting section gives a schedule of bird notes and songs.

"SAILING AND SMALL BOATS FOR BOYS AND GIRLS"

By J. M. Lewis

(English Universities Press. 6/–)

Mr. Lewis has added an interesting volume to the now well-known "Junior Teach Yourself" series of books for boys and girls. Boating and sailing are becoming more and more popular, and all who are interested in them will find the author an excellent guide in the early stages of this pursuit. With this aid they will learn not only how to manage boats in all circumstances, but how to take care of the vessels themselves and how to behave in any difficulties that may arise.

Mr. Lewis emphasises that the first essential is a good bump of sea-sense, which is most safely developed in shallow water, using a simple and steady rowing boat. After explaining the make up of a boat he deals first with canoes and their management and then with rowing, giving excellent advice that will help in the development of good style and efficiency. Then he turns to the most difficult and fascinating of all boating pursuits—the adventure of sailing. Here a general account of sailing boats is followed by a section on sailing a dinghy, the smallest and most inexpensive type of sailing craft, and the rest of the book is devoted to navigation, weather and tides, signalling and other important features of the sailing craft.

The book is well illustrated by good line drawings and excellent pictures, with the International Code of Signals in colour.

"BRITISH CARS 1951"

By Peter Chambers (P-C Publications. 6/–)

Here is the 1951 edition of this valuable annual, which gives a pictorial record of every passenger motor car produced by British firms to-day. Beginning with the A.C. and the Allard, it goes through the list of British cars in alphabetical order, ending with the Vauxhall and Wolseley productions. In each case there are excellent pictures showing the cars in their various styles of bodywork, with brief but informative notes; and at the end there is a table of specifications, the details shown ranging from engine capacity and number of cylinders to gear ratios and fuel consumption.

Civil Engineering Construction in a New Town

By Stanley J. Asher, A.M.I.C.E.
Illustrated by Godfrey W. B. Bell

CIVIL Engineering construction is basically as it was in Roman times—digging a hole and filling it with something is a brief but largely accurate description. To-day, however, the designing engineer has to solve trickier problems to meet the modern demand for better roads, better drainage, better water supply and so on, so that the holes have to be bigger and better and have more complicated things in them. All this is particularly true of the New Towns, such as Hemel Hempstead, which, as you might expect, will embody the latest practice in Civil Engineering design.

However, we are not now interested in design matters, but in the means chosen by contractors to realise those designs; and here we find, as elsewhere, that economic and other conditions require the digging and building operations to be mechanised wherever possible.

The maid-of-all-work in the digging department is the mechanical excavator. This is a diesel or petrol driven crawler mounted machine, made in several sizes, which can be adapted to a variety of conditions by fitting different equipment to its business end. Fig. 1 shows it working as a "back acter," in which form it is particularly suitable for digging trenches, of which there will be some 100 miles in Hemel Hempstead for sewers alone. The machine shown is a 19 R.B. (Ruston Bucyrus). The bucket holds 5/8 cubic yards, and the machine can dig 200 tons of earth a day, and go down to depth of 18 ft. Fig. 2 shows a similar machine lowering 4 ft. dia. concrete pipes into the trench it has just dug.

Fig. 3 shows the excavator fitted with a skimming attachment, used for such shallow excavations as road foundations. An expert driver can trim the formation to half an inch of the correct level.

With a 40 ft. boom the machine becomes either a crane or a dragline excavator, in which latter form it is seen in Fig. 4, digging a very large trench for a storm water culvert. The dragline is the most artistic of the digging machines for its particular type of work, and gives ample scope for the considerable skill required to operate it. All the really large excavators are of this type.

Fig. 1. Mechanical excavator working as a "back acter."

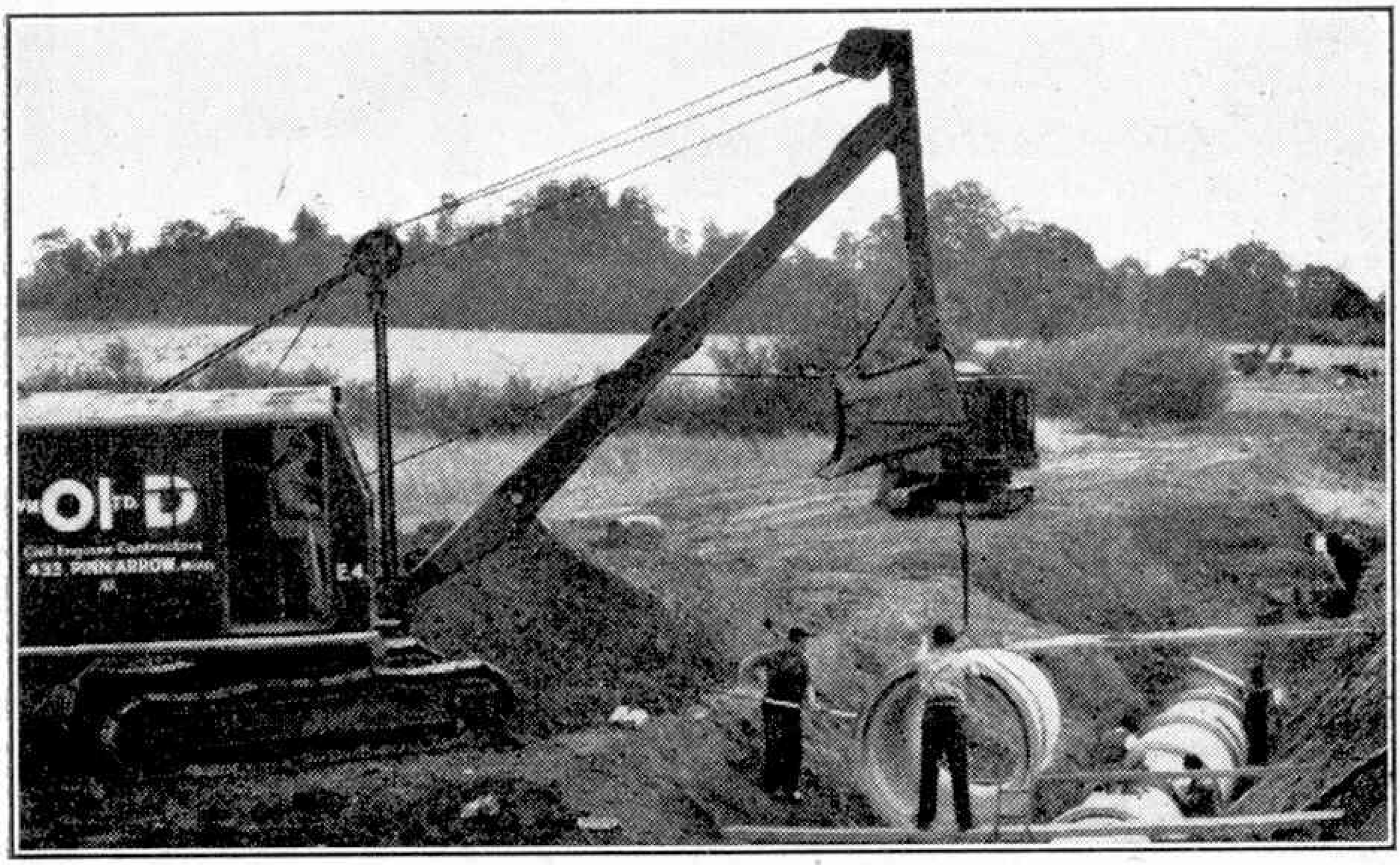
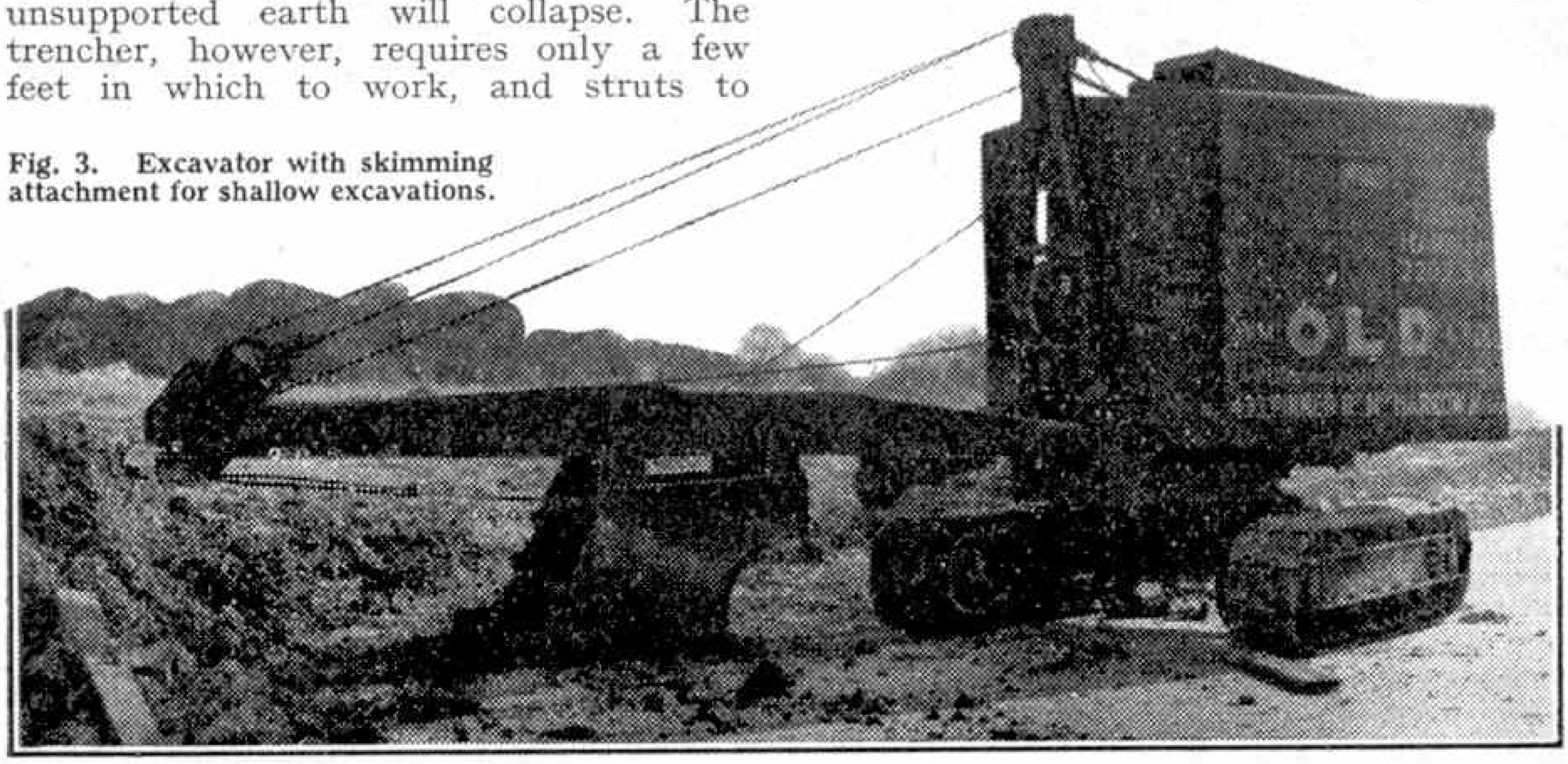


Fig. 2. A machine like that in Fig. 1 laying 4 ft. dia. concrete pipes into the trench it has just dug.

The trencher shown in Fig. 5 is, as its name implies, a one-purpose-only machine. It works like a dredger, having a boom carrying buckets on an endless chain. Although not versatile like the excavator, it showed its value when digging deep trenches in bad ground at Hemel Hempstead. Compare it with a back acter. The latter requires a length of about 15 or 20 ft. of trench, clear of obstructions, in which to work its jib and bucket, so that it is not possible to put in struts to support the trench sides along this length. In bad ground, this unsupported earth will collapse. The trencher, however, requires only a few feet in which to work, and struts to support the trench can be put in close to the boom. The trencher shown is the Allen 16/60. It can dig a trench 4 ft. 6 in. wide and 14 ft. deep.

The scraper, Fig. 6, is a different type of excavator. It is in effect a cart, with its front end closed by a movable gate. It is towed by a tractor, the driver of which also works the scraper's various mechanisms. In operation the body is lowered so that earth is scooped up to fill it, much as an engine scoops up water when travelling. The gate is then closed, and the outfit trundles to the spoil tip,

Fig. 3. Excavator with skimming attachment for shallow excavations.



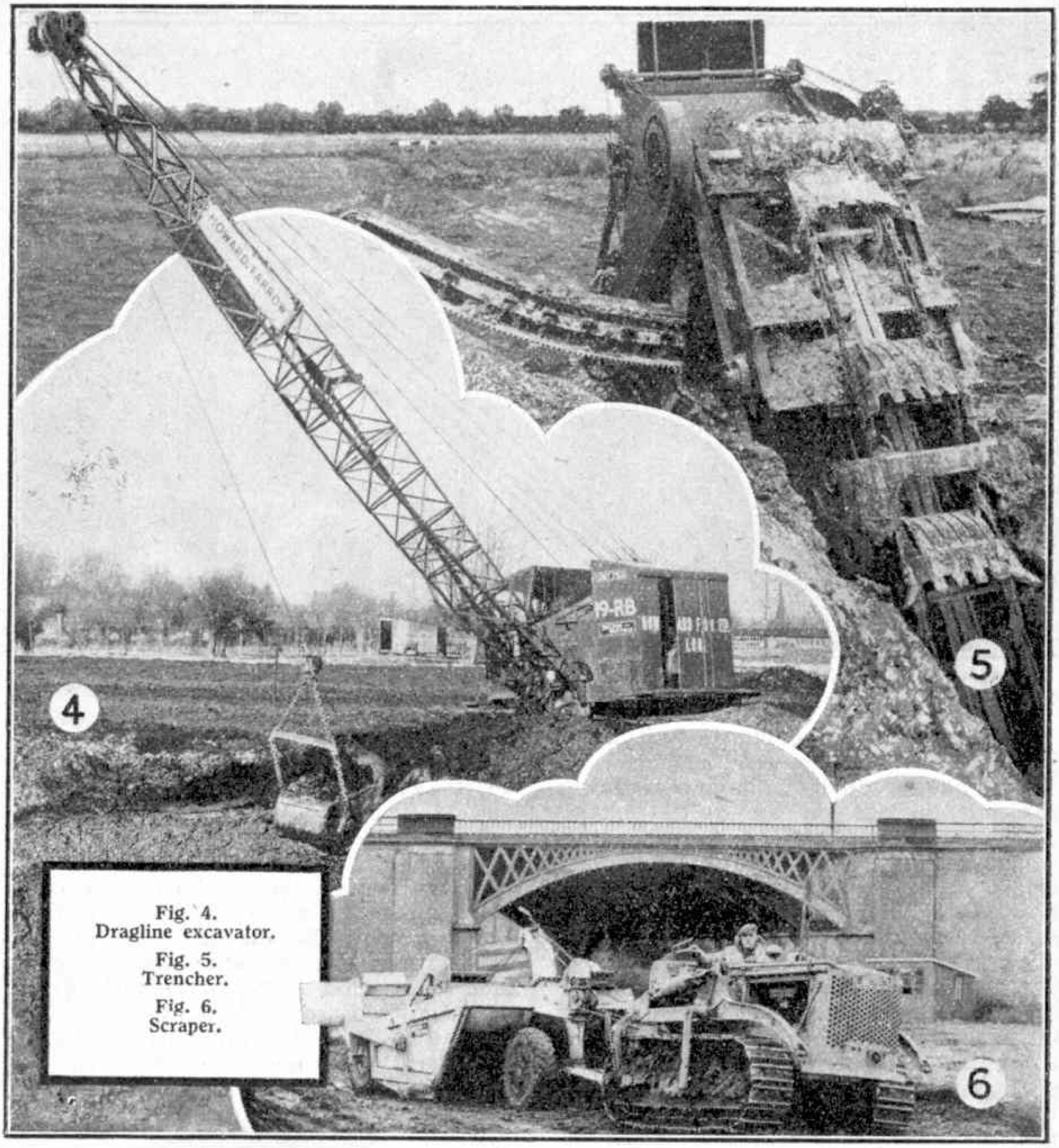


Fig. 4.
Dragline excavator.

Fig. 5.
Trencher.

Fig. 6.
Scraper.

where a ram is operated to push the spoil out. So that, unlike other excavators, it not only digs, but also transports, unloads and spreads the spoil. It is used in extensive excavations where the spoil tip is close to the site. The picture shows a small scraper of six tons capacity, stripping top soil from the area required for the construction of a storm water culvert.

The New Towns are among the few major constructional jobs undertaken since 1939. In no way do they illustrate changes in practice more than in the use of concrete, which in its various forms has almost supplanted other materials for civil engineering construction.

The concrete mixer is familiar enough, but to produce the consistently high quality concrete demanded by modern design methods, present-day plant must include means of weighing the materials which go to make each batch of concrete in order to ensure consistency of mix. Fig. 7 shows a medium size plant of this type. It can produce 150 tons of concrete a day, and requires only three men to work it. A Blaw Knox continuous power loader (right) lifts the gravel and sand into their respective sections of the bin (centre) below which is the weighing hopper, in which are weighed the correct amounts of sand and gravel, before they

are discharged into the mixer hopper. This raises them together with a bagful of cement into the mixer (left), where they are mixed in the usual way, with the correct amount of water.

Fig. 8, which shows a reinforced concrete storm water culvert under construction, is a good illustration of the use to which concrete is put. And also, incidentally, of the modern demand for better drainage in the New Towns mentioned in the first paragraph. Concrete is being placed into 30 ft. long moulds, or "shutters" to form the culvert walls. When it has set, in about 16 hrs., the shutters, which are suspended from a carriage, will be pushed along on rails and set up again for the next length. The man with the long tube is using a vibrator, which has, in its poker-like end, a high speed compressed air motor which, by driving an eccentric, causes the poker to vibrate.

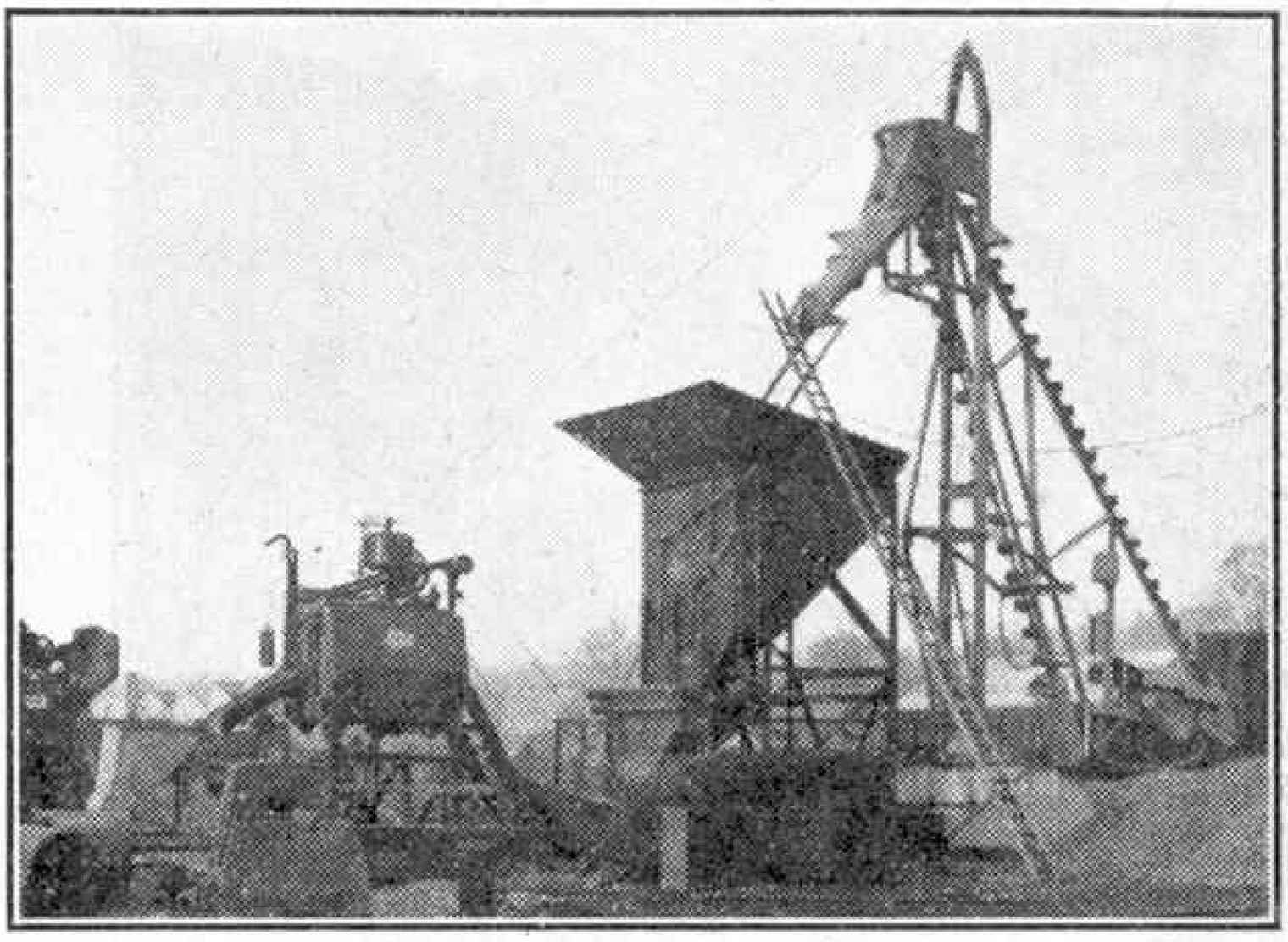


Fig. 7. Concrete mixing plant.

Fig. 8. Reinforced concrete storm water culvert under construction.

When the poker is dipped into the concrete this vibration causes compaction by shaking the concrete together. The same principle, in a different form, is illustrated in Fig. 9, where concrete for a road is being compacted with a tamper vibrated by a petrol engine bolted to it.

The works illustrated are for the Hemel Hempstead Development Corporation, to the designs of their Chief Engineer, Mr. J. W. Henderson, B.Sc., A.M.I.C.E.

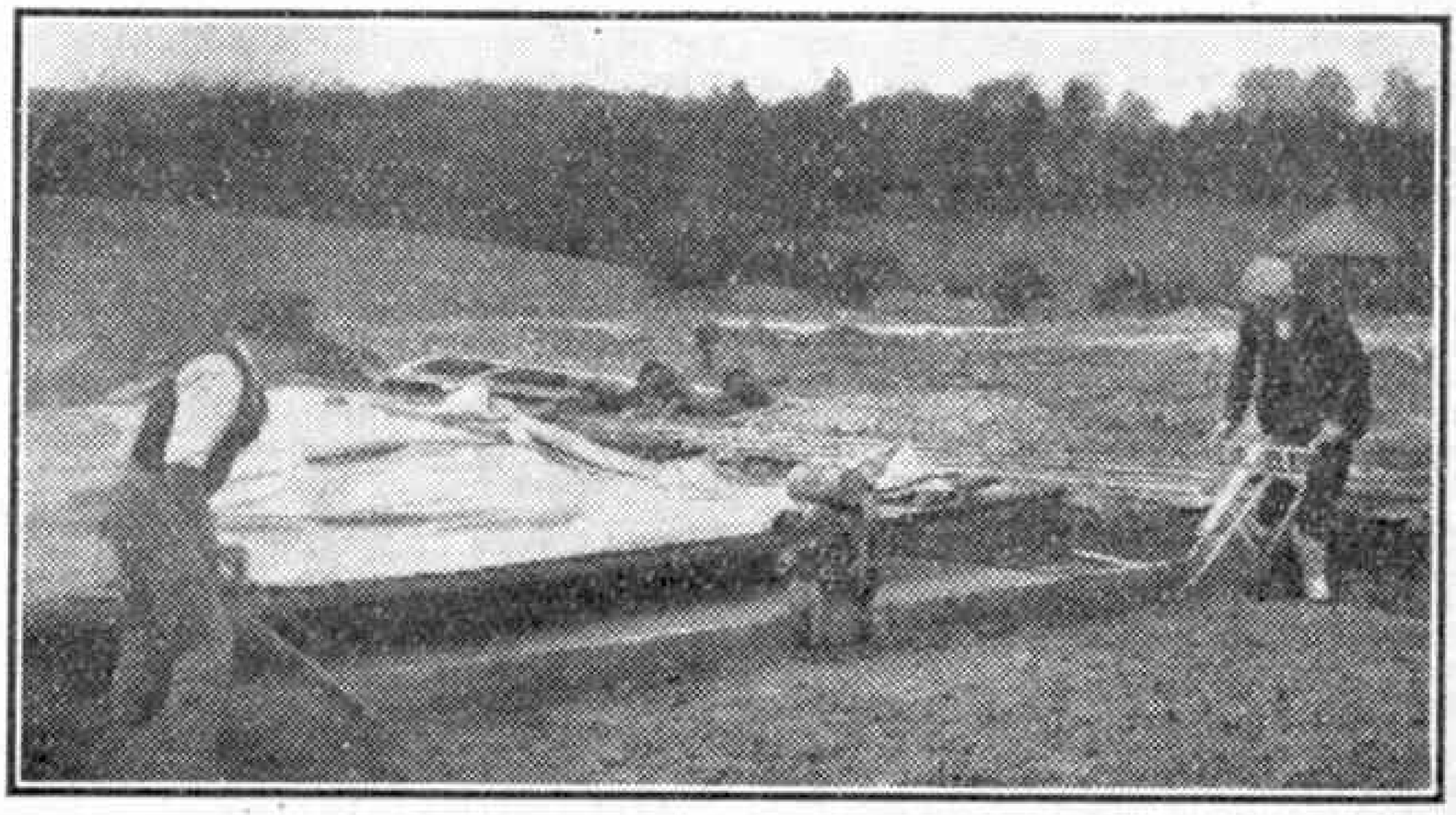
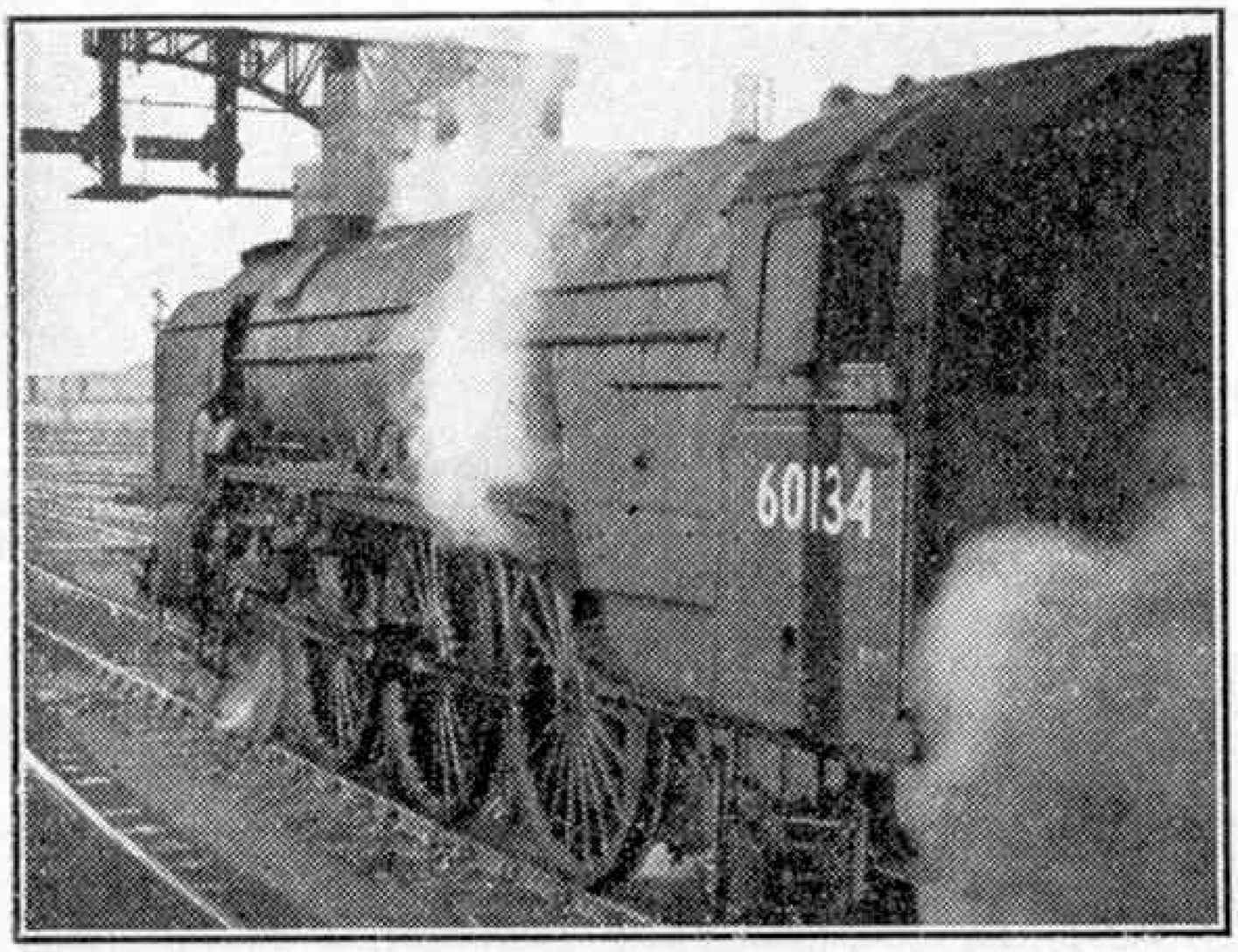


Fig. 9. Road tamper vibrator.



No. 60134 "Foxhunter" waiting to shunt the Bradford section of the "Yorkshire Pullman" on to the Harrogate section at Leeds Central. "M.M." Prize-winning photograph by V. G. Earley.

Railway Notes

By R. A. H. Weight

Standard Locomotive Developments

By the time these notes appear, all the 25 class "7" 4–6–2s will probably be in service with Nos. 70015–24 allocated to the Western Region, subject to trial periods elsewhere. No. 70015 "*Apollo*" has been on loan to Camden shed, L.M.R., and making regular runs from Euston to Liverpool and back. No. 70005 "*John Milton,*" after leaving Rugby Testing Plant, was given extensive trial, including heavy loads, over the steeply-graded Midland main line between Skipton and Carlisle. No. 70016, "*Ariel,*" has also been running thereon.

Continental expresses on the Victoria-Dover route have been hauled by No. 70014 "*Iron Duke,*" after running trials with fast trains to and from Waterloo. In the latter duties, No. 70009 "*Alfred the Great*" also was engaged for some time. The 10 class "6" "Pacifics" for Scottish service, Nos. 72000–9 bearing "Clan" names, will probably be built soon.

Class "5" 4–6–0s Nos. 73000–29, being built at Derby, are for allocation to the Scottish and London Midland Regions. Nos. 73005–9 were lately completed for Scottish service, and the first two of those, stationed at Perth, were observed together hauling the northbound Royal Train past Forfar on 3rd August last. This special had left London in charge of 4–6–2, No. 46237, "*City of Bristol.*" Earlier locomotives of the new class "5" series have been noted working from Derby to Manchester, St. Pancras, York, and elsewhere.

Class "4" 4–6–0, No. 75000, constructed and stationed at Swindon, headed the 2.42 p.m. semi-fast Swindon-Paddington train when I travelled part of the way by it early last summer, incidentally in an L.M.R. corridor coach. There are to be 20 engines of this type.

No. 80011, the second of the modified standard 2–6–4T design, was exhibited at Marylebone Station, London, in August last, being stationed at Tunbridge Wells with No. 80010 and probably others. These locomotives initiate a series of 44 to be built at Brighton; some intended for other Regions will be provided with water scoops.

"The Swansong of a Skylark"

Under the above intriguing heading the "*Journal of the Stephenson Locomotive Society*" describes the successful and novel excursion organised for S.L.S. members and friends in conjunction with British Railways, Western Region, from Birmingham and Leamington to Swindon and back in June last. The train was hauled by one of the last of the famous 4–4–0 "Bulldog" class engines, No. 3454 "*Skylark,*" with five coaches. Stops were made at Oxford and Didcot to enable the party to detrain and make a brief inspection of the running sheds at each place. At Didcot this involved reversing the train and turning the locomotive. An additionally enterprising feature was the running of the special on the outward journey into Rodbourne Lane Siding at Swindon, right in the heart of the works, which were toured without restriction, the party afterwards passing on to view the running shed.

In the course of the return run, the enthusiastic crew from Tyseley depot on the footplate of "*Skylark,*" which alas will inevitably soon pass to the scrapheap, made some exceedingly speedy running with maximum speeds of 65–70 m.p.h. At one point the train was as much as 19 min. ahead of a fairly liberal schedule and arrived back in Birmingham well before time, where there were hearty congratulations to all concerned in the organisation and operation of the tour.

Special train tours of a similar nature arranged by the S.L.S., the Railway Correspondence and Travel, or other Societies have included Nottingham area lines, some not normally used for passengers, with a G.N. 4–4–2T as the motive power; a Pennine tour in the Huddersfield district behind an L. & Y. 2–4–2T and Western Region diesel railcar trips.

New Third Class Sleeping Cars

The experimental third class sleeping cars providing more exclusive accommodation, with full bedding and washing facilities, that have been running for some time on the King's Cross–Edinburgh service have evidently proved a success. British Railways are now building 21 new cars containing either 11 or 12 compartments, each comprising two fully-bedded berths, one upper and one lower, together with individual lighting for each, luggage space and toilet accommodation. It is hoped to have them operating in certain night trains between London and Scotland or the North of England this autumn.

Southern Tidings

In consequence of the withdrawal of the last surviving members the following engine classes are extinct: "D1" 0–4–2T; "B4" 4–4–0; "H1" 4–4–2 "Atlantic"; "IIx" 4–4–2T; "J1–2" 4–6–2T; "K10" 4–4–0; "T" 0–6–0T; "T1" 0–4–4T; and "T14" 4–6–0. The "Atlantics" scrapped were named "*Portland Bill*" and "*Selsey Bill*" respectively. The one "IIx" that had been running for some time up to withdrawal date still carried its Southern number and lettering. There will be many regrets that an ex-L.B.S.C. 4–6–2 express tank locomotive will not be seen again, and that the Marsh "13" 4–4–2Ts are going so rapidly.

The "H2" 4–4–2 "Atlantics" were doing considerable work last summer with heavy Newhaven boat trains, as well as through Sussex coast–Midlands trains, which they worked as far as Kensington or Willesden Junction. Three out of the five remaining "Atlantics" were engaged in the haulage of one holiday special from Birmingham L.M.R., one from Willesden to Brighton, another to Eastbourne and a third forward to Hastings!

Class "4" L.M.S. type 2–6–4Ts take a considerable share in working these trains along the Sussex coast lines, sometimes with 11 corridor coaches. They also run between London and Brighton by various routes. They have been noted on London–Ramsgate semi-fast trains; working through from Brighton to Salisbury and back; on local Kent or Ashford–Hastings services and elsewhere. Their allocation has been slightly amended. Nos. 42094–5, the last of the batch of 41, are allocated to Ramsgate and Tunbridge Wells respectively.

"Schools" are now permitted to run between Hastings and Ashford. They sometimes work the morning round trip Hastings–Ashford–Tonbridge–Hastings, afterwards going to Charing Cross and back in the afternoon. "West Country" 4–6–2s Nos. 34045–8 were recently allocated to Brighton in place of those moved away. For a time last summer No. 34104 "*Bere Alston*" regularly hauled the "*Golden Arrow*" expresses, formed of new cars. A "Merchant Navy" is usually on the heavy ordinary portion of that London–Dover boat service. Several of the rebuilt Wainwright 4–4–0s, also Adams "G6" and "02" tanks are receiving new parts and general overhaul in works.

The "F1" Stirling 4–4–0 No. 1231, which had been standing at Ashford for a long time after official withdrawal in case of preservation, has been scrapped. Summer traffic was very heavy, particularly at week-ends during July and August, as it was on various lines in other Regions.

A G.W.R. "Bulldog" 4-4-0 No. 3377, now withdrawn, on a Worcester train at Stratford-on-Avon. Photograph by Derek Megainey.

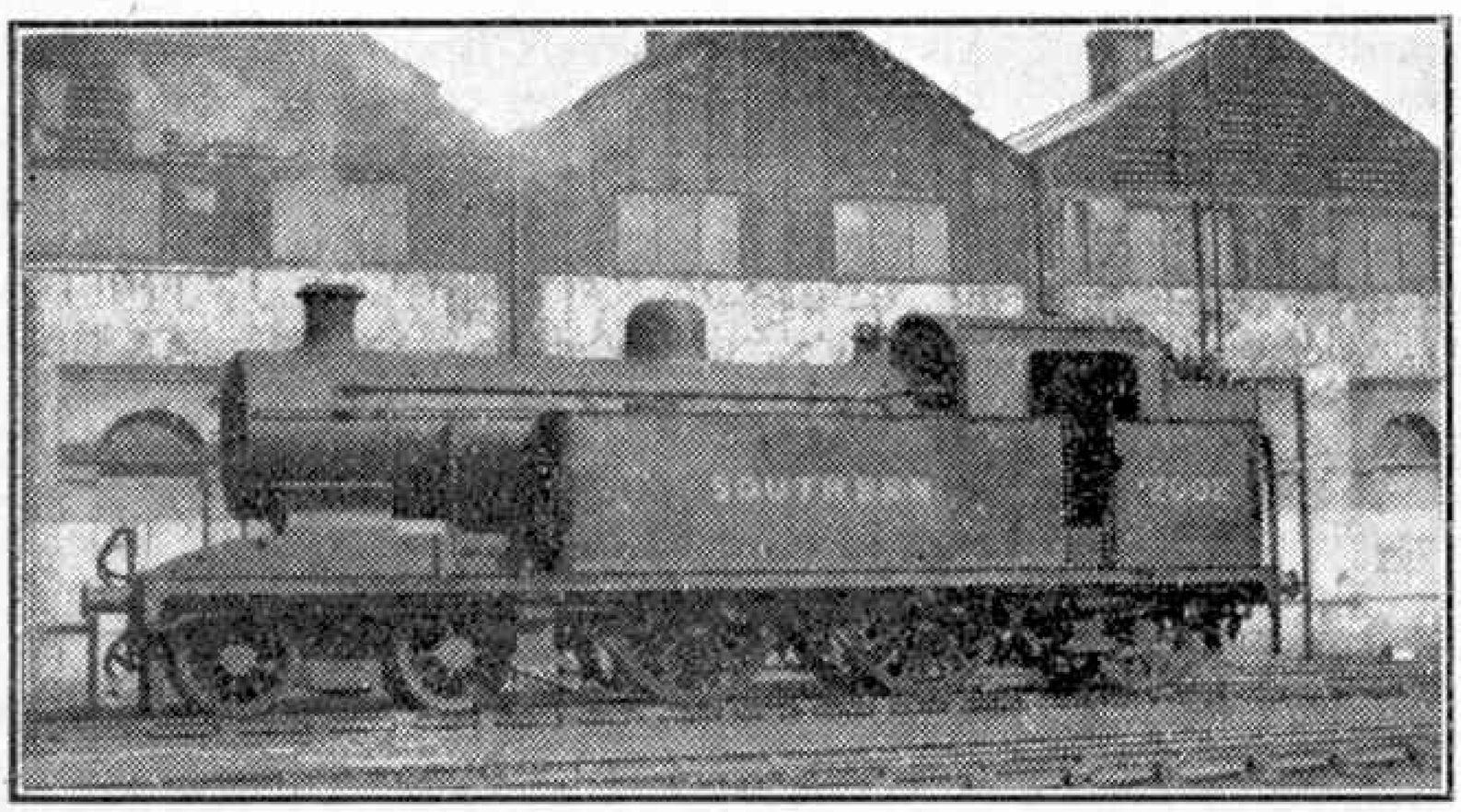
Eastern and North Eastern Regions

The second series of "J72" 0–6–0 shunting tanks built to the former North Eastern Railway design has been completed, Nos. 69021–8. They are stationed at Darlington and in the Newcastle district. Further "B1" 4–6–0s from the North British Locomotive Company's Works were lately placed in service, Nos. 61376–9. No. 61379 has been named "*Mayflower*," commemorating the ship that took the Pilgrim Fathers from Boston (Lincs.) in 1620, to what is now the U.S.A.

Class "4" 2–6–0s constructed at Darlington or Doncaster have been allocated as follows: Nos. 43100–3, 53A, Hull (Dairycoates); Nos. 43104–6, 43109–11, 31D, S. Lynn; and Nos. 43107–8, 35A, Peterborough. No. 43111 has been reported working a goods train from King's Cross to Peterborough. Class "2" light 2–6–0s numbered from 46465 are in hand at Darlington for the Eastern Region.

"N7" 0–6–2Ts are working on the Alexandra Palace branch. The old G.C. tanks recently used thereon have been withdrawn and the two G.N. "C12" 4–4–2Ts transferred to S. Lynn. "Sandringham" 4–6–0s "*East Anglian*" and "*City of London*" have had their streamline casings removed, and are classed "B17/6" with 225 lb. per sq. in. boiler pressure.

Some very high speeds have been recorded on the Norwich–Liverpool Street expresses when hauled by "Britannia" engines. Excellent runs have also been recorded on occasion behind "A4" or "A1" locomotives, when the accelerated timings of the "*Flying Scotsman*," "*Yorkshire Pullman*," "*Norseman*," and other fast East Coast expresses have been improved upon. The famous streamlined "Pacific" No. 60022 "*Mallard*" was seen a great deal during the summer running of the "*Capitals Limited*," scheduled to make the record non-stop between King's Cross and Edinburgh (Waverley) in 7 hr. 20 min. with a 12-coach air-conditioned train. Though stationed at King's Cross, she was for a time working on the Haymarket (Edinburgh) turn. Normally, Eastern and Scottish Region "A4" locomotives ran alternately.



The last surviving Southern 4-4-2T of class "Iix" No. 2002, now withdrawn. Photograph by D. L. Bradley.

The Royal special train including a red and cream sleeping car conveying H.R.H. Princess Elizabeth and party back to King's Cross after visiting the R.A.F. College at Cranwell, Lincs., was hauled by No. 60017 "*Silver Fox*."

The nameplates bearing the original companies' coats of arms above are now being fitted to certain "A1s" and are shorter than those carried by other engines of the class. No. 60113 "*Great Northern*" has a new plate. Similarly, named for the first time is No. 60161 "*North British*." No. 60161, like No. 60159 "*Bonnie Dundee*," is stationed at Haymarket.

Introducing the Pack Plane

By John W. R. Taylor

A MONUMENT has been erected in West Berlin to commemorate the courage, skill and sacrifice of the American, British and French airmen who flew vitally-needed food and supplies into the city during the Russian blockade of 1948-9. Politically, it is appropriate, for the Berlin Air Lift was an outstanding victory in the so-called cold war against Communism. From an aviation viewpoint, however, the Air Lift was a costly demonstration of the ability of our airmen to achieve miracles with aircraft totally unsuited for the task.

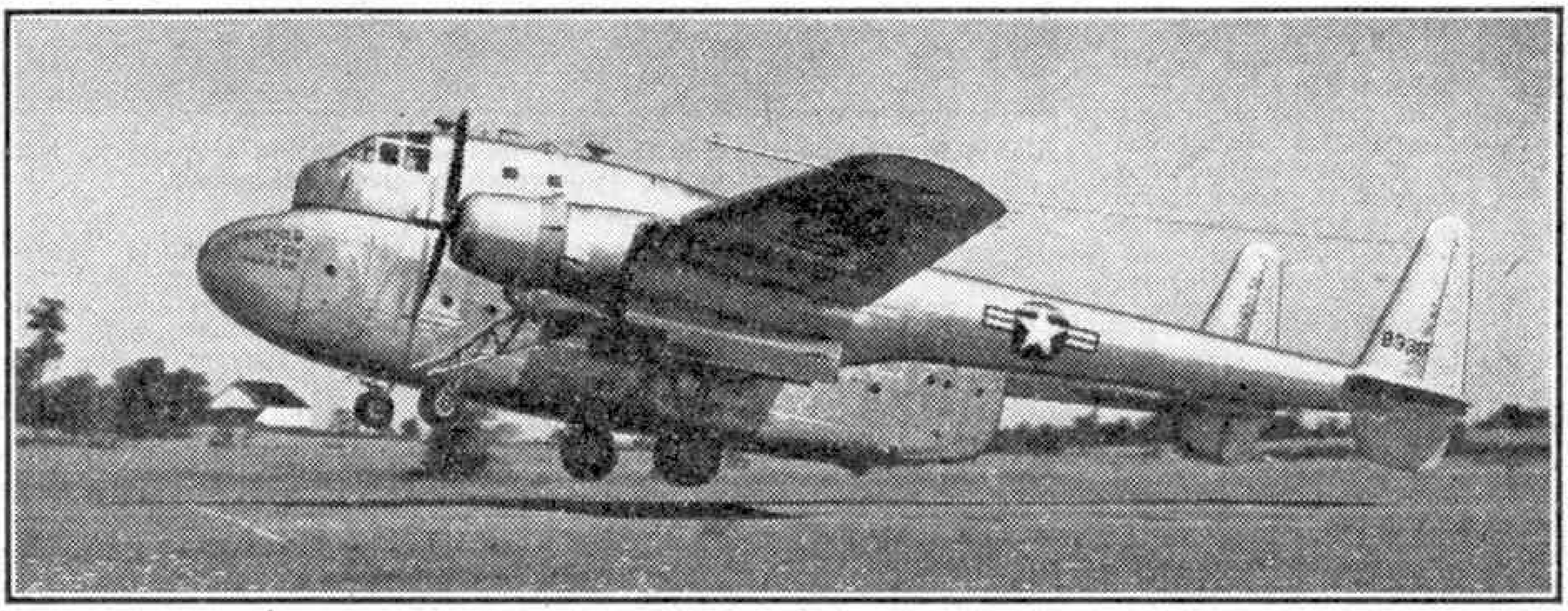
That fact does not lessen the achievement. Week after week, month after month, in all weathers, "Dakotas," "Yorks," "Skymasters," "Tudors," and other aircraft operated the arduous shuttle service through three narrow air corridors with incredible regularity and reliability. But the "Daks" were too small for the job, and experience proved that a smaller number of larger aircraft could have carried the same quantities of cargo quicker, cheaper and on much less fuel. Similarly, the larger types used in the operation had for the most part been designed for passenger-carrying. As a result, they had only small doors set in the side of their fuselages, through which it was difficult to manœuvre heavy sacks of flour and coal or machinery.

It is therefore hardly surprising that one of the most popular machines on the Air Lift was the Bristol "Freighter," which carried a five-ton cargo and could be loaded and unloaded in record time through the big doors which form the nose of its fuselage. It was such an obvious improvement over side-loading that "Freighter"-type nose or tail loading doors have become an indispensable feature of almost all freight aircraft built since that time.

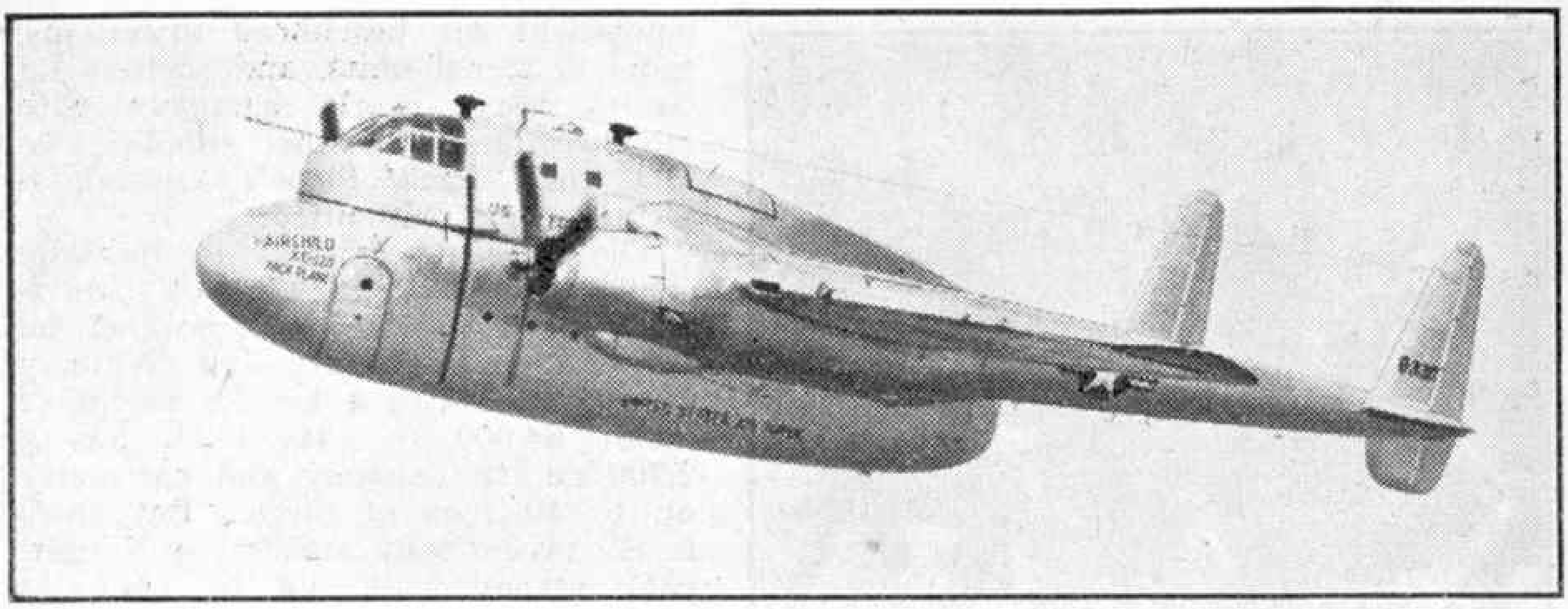
The American Fairchild Company have now gone one better, by building an aircraft named the XC–120 "Pack Plane," with a completely detachable cargo-hold. The idea is not altogether new, but has never before been tried on such a large aircraft. Basically, it works on the same principle as the railway "container" scheme, by which anyone wishing to move his household goods from one end of the country to the other can hire a container from the railway, pack it full of furniture outside his home, have it carried to the nearest railway goods station, from there to a station near his new home by rail, and then to the house itself on another lorry. By avoiding the necessity of unpacking and packing the goods at intermediate stops, time and money are saved and risk of damage is reduced to a minimum.

The "Pack Plane" offers exactly the same benefits, plus a lot of others that make it potentially the most useful military and civil air transport ever built.

To start with, the Pack itself is not



Fairchild XC-120 "Pack Plane" taking off with cargo container attached. The illustrations on this and the next page are reproduced by courtesy of the Fairchild Aircraft Division, U.S.A.



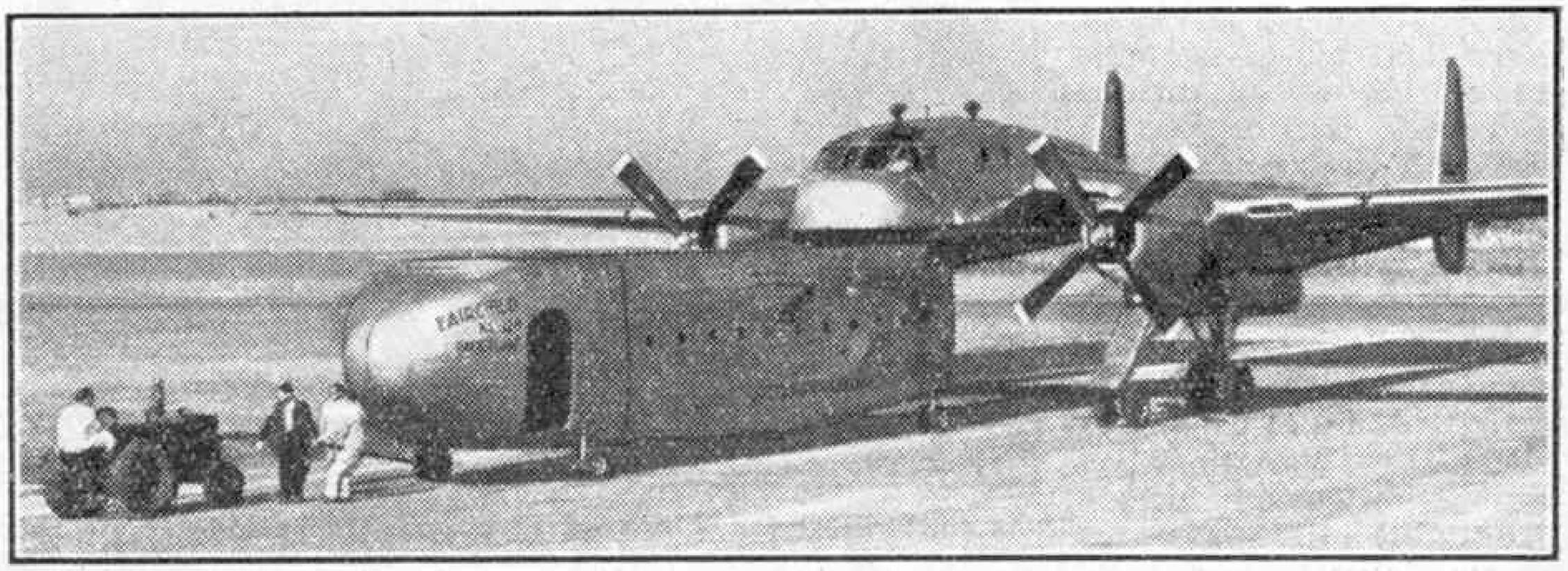
The Fairchild "Pack Plane" on its maiden flight.

part of the aircraft structure; in fact the "Pack Plane" can, and does, fly quite happily without it. Consequently, the Pack need not be made of expensive aircraft materials, as it need be sturdy enough only to carry a particular type of cargo. One built to carry motor vehicles will have to be stronger than another intended for delivering ready-made clothes, but the only other requirement is that the Pack must be the right shape and size to fit under the aircraft's flight deck.

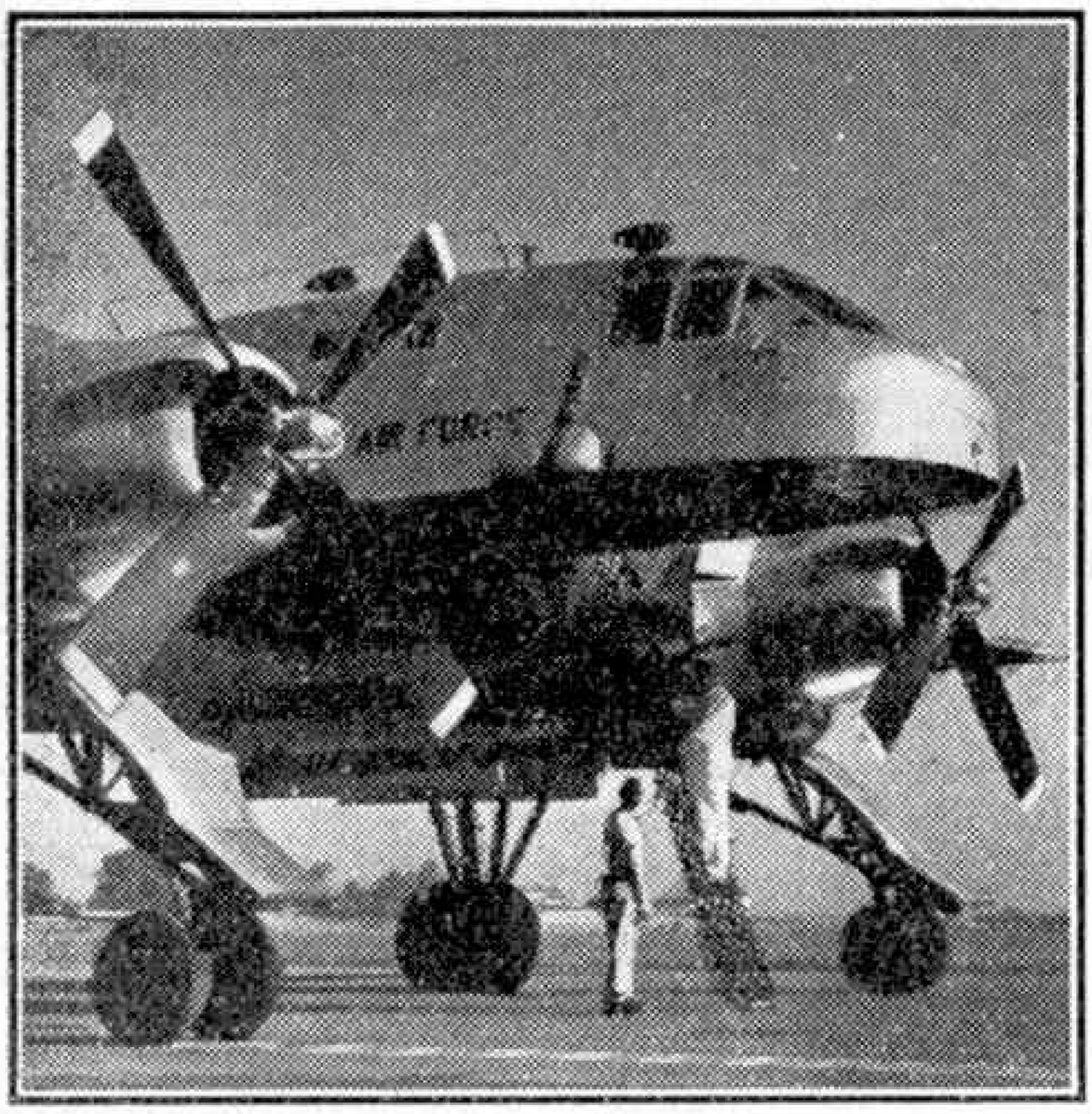
The Packs, or containers, could thus be made quite cheaply, so that companies which send their products by air regularly could afford to buy or hire a number of them for their exclusive use. Let us take the case, for example, of a big firm of publishers in London who send weekly shipments of books to Paris. At present, the books have to be loaded on to a lorry at the printing works, unloaded at the airport and put aboard a freight 'plane, which then carries them to Paris, where the whole process is repeated.

If a "Pack Plane" were available, the publishers would only have to pay for the books to be packed once—into the container at their printing works. The container would then be carried by lorry or towed to the airport, hooked in place and flown straight to Paris. At Paris, the whole thing could be unhooked in a matter of minutes and towed away. Meanwhile, another Pack of, say, medical supplies produced by a French firm could have been hooked into place equally quickly and the "Pack Plane" flown off at once to a new destination—say Berlin—where a fresh cargo of typewriters might be awaiting shipment to Scotland. The manufacturers would save much time and expense; so would the aircraft operator, for his "Pack Plane" would need to be on the ground only long enough for the Packs to be changed and, when necessary, for refuelling. The resultant higher utilisation would be reflected in bigger profits for the operator and lower transport charges for the customer.

Militarily, the versatile "Pack Plane"



When the "Pack Plane" lands at its destination the cargo container is detached and towed from under the machine on its own wheels, which have been stowed within the container during the flight.



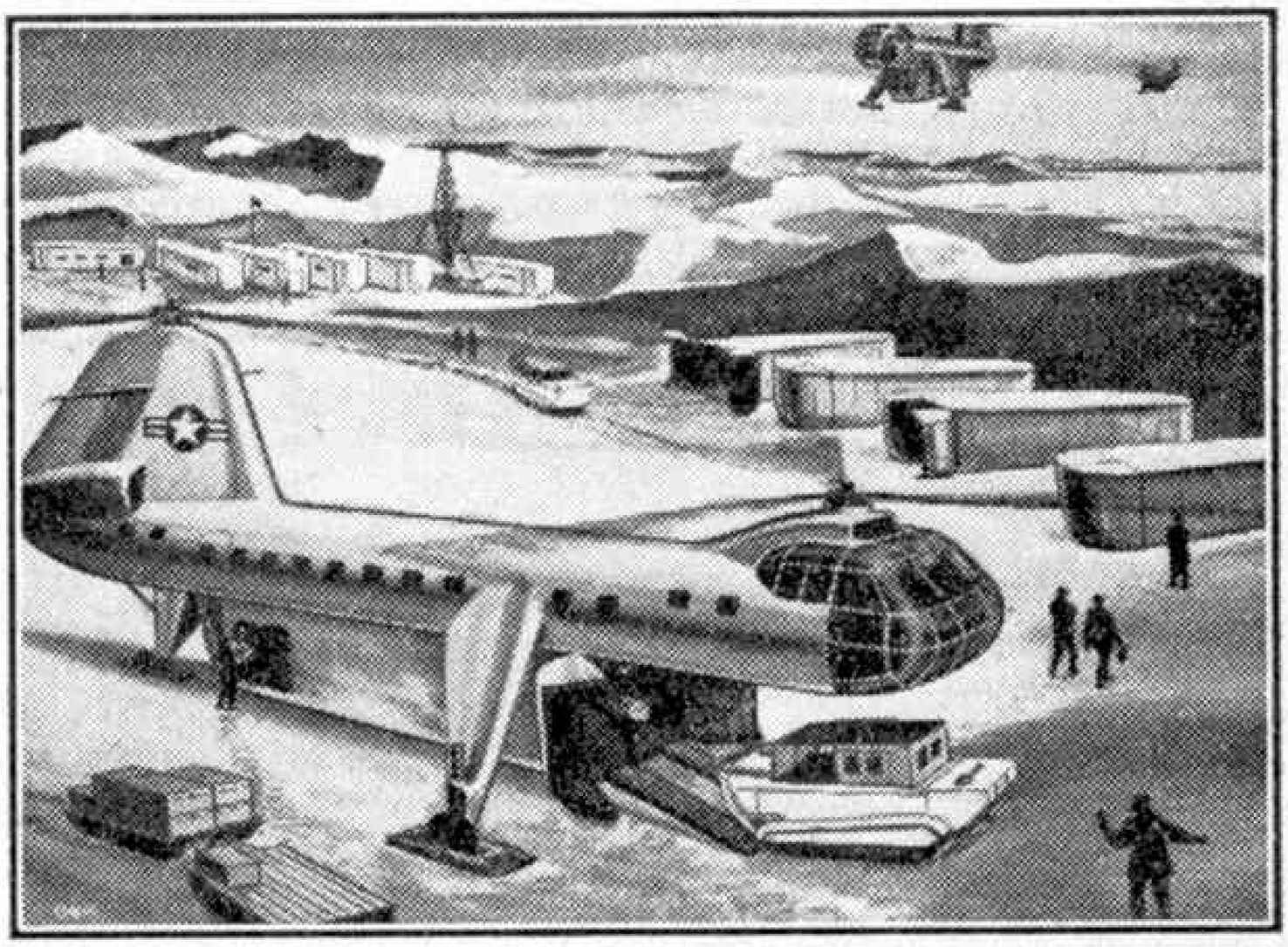
The flight deck of the "Pack Plane" is so high above the ground that the aircrew enter and leave it by means of a collapsible ladder when there is no cargo container under the fuselage. Photograph by courtesy of the Fairchild Aircraft Division, U.S.A.

is even more important. As a straightforward transport, it has all the easy-loading features of the popular Fairchild "Packet," from which it has been developed, as its Pack is fitted with big doors at each end. Furthermore, the Packs need not be unloaded in all cases. They could quite easily be fitted out as completely-equipped hospital units, machine-shops, fighter control units or headquarters offices, ready for occupation as soon as the aircraft had landed and unhooked them. Similarly, they could be used for carrying and storing fuel, enabling big stocks of petrol and oil to be built up quickly at an airfield in enemy territory seized by airborne or ground troops.

Nor is there any reason why they should not be dropped by parachute, for six-ton howitzers have already been dropped successfully from "Packets." Variations on this theme could include droppable lifeboats for air-sea rescue work, or landing barges filled with equipment for beachhead operations; radio or signal units, and shelters for Arctic rescue work, complete with food, heaters and other supplies. In fact the "Pack Plane's" usefulness seems almost unlimited.

The present XC–120 is basically similar to the C–119 "Packet" and is therefore a big aircraft, powered by two 3,250 h.p. Pratt and Whitney engines and with a loaded weight of about 64,000 lb. Its Pack has a 2,700 cu. ft. capacity and can carry up to 10 tons of cargo. But there is no reason why smaller, or bigger, pack planes could not be built, as required. Nor need they be fixed-wing machines. In fact the well-known American Piasecki Corporation is building a giant helicopter designated the XH–16, which will carry a Pack under its "Skymaster"-size fuselage. If it works—and, knowing Piasecki, that seems a foregone conclusion—the XH–16 should be the answer to the dreams of military planners for short-haul work such as carrying light tanks, equipment, troops, lorries and guns over rivers and other natural barriers, in districts where there are no airfields or where roads and bridges have been destroyed.

Finally, if it should ever be necessary to organise another Air Lift, a team of "Pack Planes" and Pack helicopters would save untold time, expense and worry. In the case of the (Continued on page 478)



An artist's impression of the giant Piasecki XH-16 helicopter, which will carry a cargo container under its massive fuselage. Other containers are seen in the background. Photograph by courtesy of the Piasecki Helicopter Corporation, U.S.A.

Engineering News

A Giant Lifting Operation

The illustration on this page shows a great absorber column being raised into the vertical position at the Stanlow (Cheshire) Refinery of the Shell Petroleum Company. The column is made of welded steel. It is more than 170 ft. high and nearly 10 ft. in diameter, and its weight is 240 tons. The column is so large that it had to be transported from the works of the makers, Babcock and Wilcox Ltd., Renfrew, in three sections, which were assembled and welded on the refinery site.

Huge gantries were specially designed for the task of raising the column to its vertical position, which was probably the largest lifting operation of its kind that has been carried out in Great Britain. Immediately behind the column is the refinery's concrete water cooling tower, the biggest of its kind in the world. This was described and illustrated in the "*M.M.*" for October of last year.

A Great Indian Irrigation Scheme

Work is now in progress on a great irrigation and hydro-electric power scheme on the River Sutlej in the Punjab. This involves the building of two dams and several power stations, with the construction of canals that will carry the water stored up behind the dams over a large area, which eventually will extend to 6½ million acres.

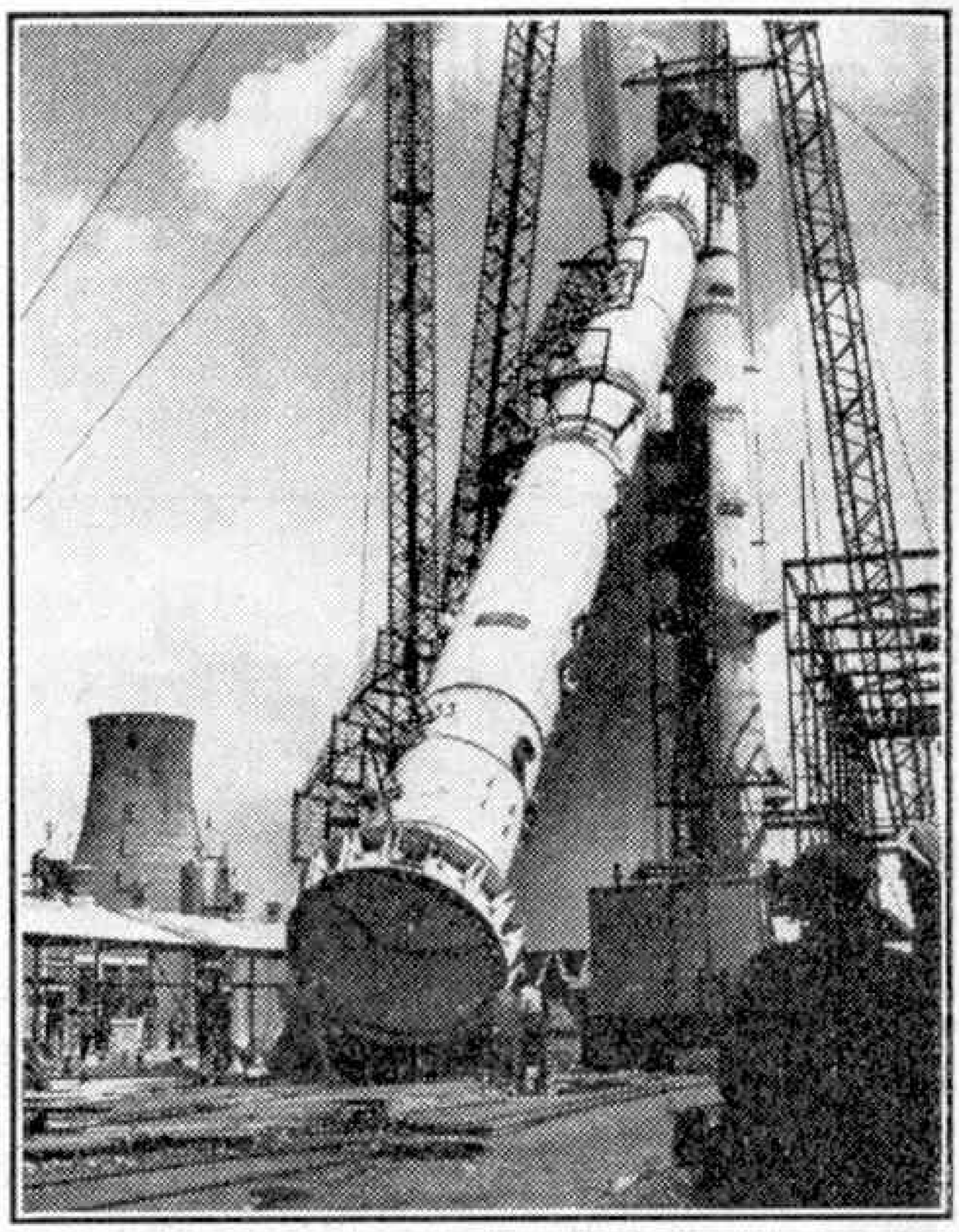
One of the dams is under construction in the Bhakra Gorge, where the River Sutlej flowing down from the Himalayas pierces the last range of hills before it enters the plains. This will be 680 ft. in height above its foundations, and along its crest it will measure nearly a third of a mile. When the dam is completed a great reservoir with a width of about 1½ miles will extend upstream from it for about 56 miles.

To allow for the construction of the dam the river will be diverted through two giant tunnels now being driven through the rock walls of the gorge. These should be completed next spring. Each will be 50 ft. in diameter and about half a mile long. The dam itself is expected to take four years to complete, and more than 5 million cu. yds. of concrete will be used in its construction. A power station is to be built near the left bank of the river, in which there will be four turbo-alternator sets, each of 84,000 kW. Later another power station will be built underground on the right bank, in a tunnel 500 ft. long, and in this eight further turbo-alternator sets will be installed as the demand for power grows.

About eight miles below the dam a second one is being constructed to store up irrigation water. The two main canals it will feed will have lengths of 40 and 108 miles respectively, and branches will bring the total length of the network to over 2,600 miles.

Escalator with Record Span

The escalator in the Dome of Discovery at the South Bank Exhibition in London is believed to have the longest escalator span yet built. Its inclined section, 70 ft. in length and 35 ft. high at its upper end, is completely unsupported except at its two ends. It is designed to carry a moving load of up to 9½ tons, in addition to supporting its own weight and that of the driving mechanisms, and special steps were taken to ensure that there should be no failure of the long span under the stresses imposed upon it.



Raising a welded steel absorber column, 170 ft. high and 240 tons in weight, at the Stanlow Refinery, Cheshire. Photograph by courtesy of the Shell Petroleum Co. Ltd.

Each step of the escalator is intended to carry two grown-up people in comfort. Its speed is 100 ft. a minute. Its capacity is rated at 8,000 passengers an hour, and during tests it actually carried 9,000 in that time. Safety devices cut off current and apply a brake if the escalator runs too fast. Automatic brakes are immediately applied if the driving chain snaps, and special switches stop the escalator if one of the main step chains stretches too far or breaks.

A New Colorado Dam

The power station at the Hoover Dam, in the United States, began to deliver current to Los Angeles 15 years ago. Other dams have since been built at suitable points on the Colorado River below it, and the lower waters of the river now have a stairway of these structures over a length of about 300 miles. Each of these has built up behind it a lake, the water of which is used for developing electric power, and also for irrigation.

The latest addition to this system is the Davis Dam, 67 miles below the Hoover Dam. This has a height of 135 ft. and a length at its crest of 1,600 ft. The power station installed is the fourth largest of those built by the U.S. Bureau of Reclamation. The first of its five 45,000 kW. generators came into operation in January of this year, and the remaining units are now in production.

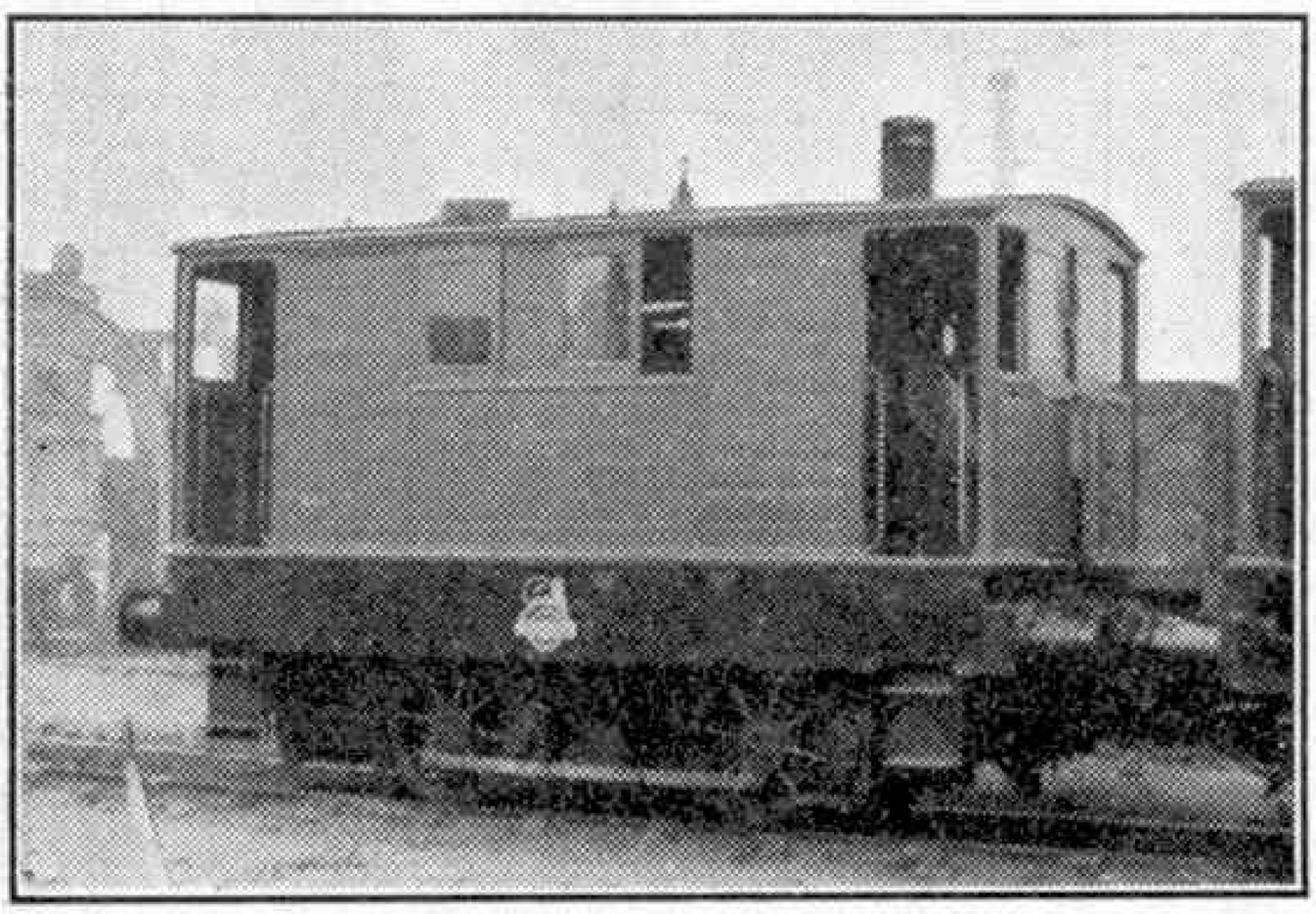
An Electronic Press Guard

The General Electric Company has introduced an electronic guard for power presses that takes up less space than the usual mechanical one. In this a lamp projects a beam of light across the front of the press and this is reflected backward and forward by a series of mirrors so that the whole area is covered before the beam falls on a photo-electric cell. If the beam is interrupted, say by the hands of the operator, the press is automatically stopped and a Klaxon horn sounds a warning.

East Anglian Dock Railway Working

By M. H. Solomon

THE docks of East Anglia, at Ipswich, Lowestoft and Yarmouth have a fascination for the railway enthusiast because of the unusual locomotives and specialised methods of working employed.



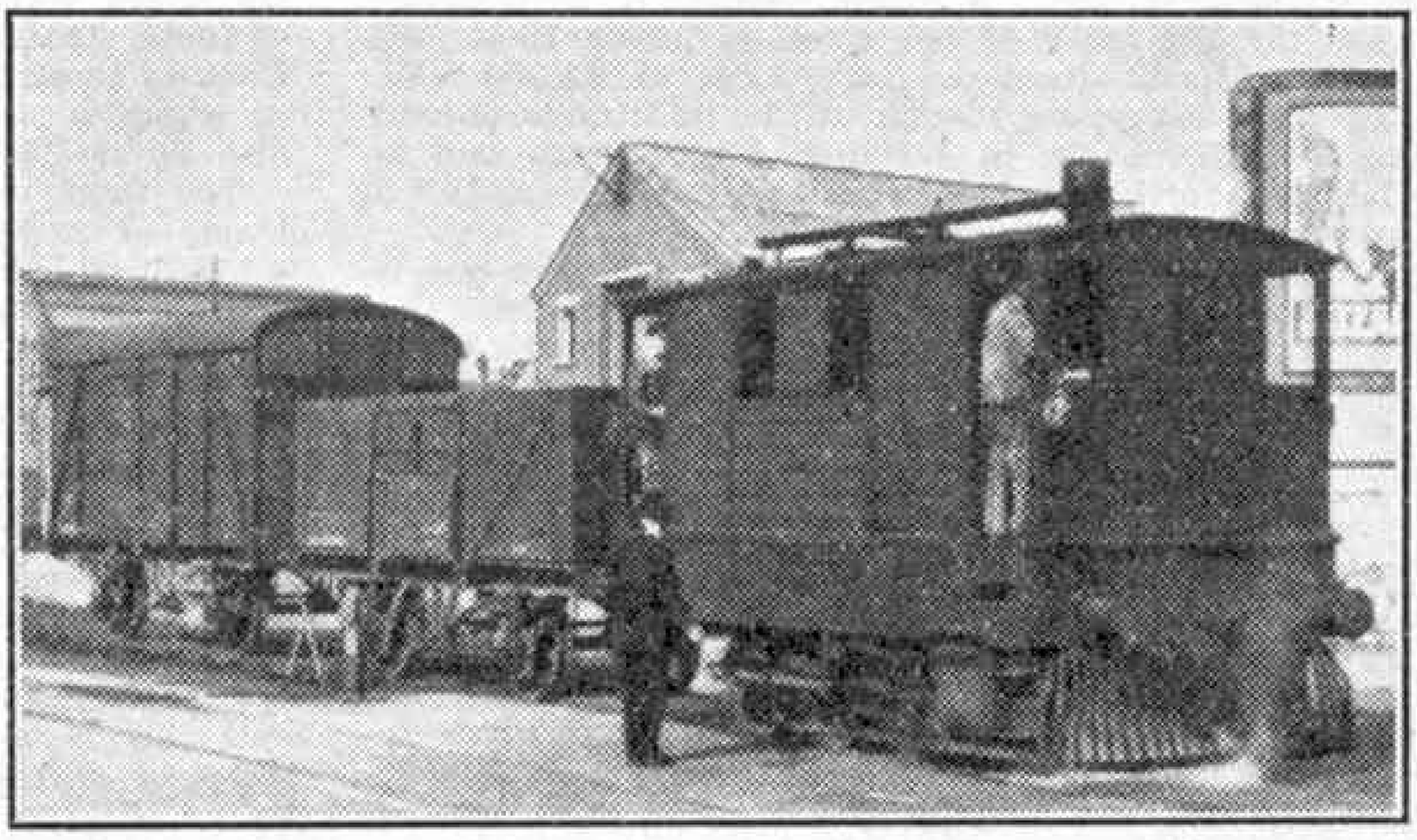
One of the earliest design of "Tram" engine of Great Eastern origin of class Y6. This remarkable looking locomotive proudly sports the B.R. emblem.

At Harwich things are more or less ordinary, because motive power is provided by comparatively modern side-window 0–6–0 tanks of Class J68 and standard shunting practice is employed.

The dock railway system at Ipswich may be divided into two parts, one consisting of the quay lines and the other including the associated marshalling yard. Unfortunately, these are separated by a roadway, and as level crossing gates would be unsuitable owing to the amount of shunting carried on, the following method is used. An official with red flag and whistle is permanently on duty to control the rail traffic when movements across the road are necessary. As an additional precaution the engine bell is rung noisily on approaching the road thus giving audible as well as visual warning to pedestrians. Incidentally, this necessity of crossing a fairly busy road when shunting operations take place is not confined to dock working; at North Road Works at Darlington there is a level crossing over the road and every time that one of the frequent movements takes place in the works yard the gates have to be closed against road traffic.

Special "Tram" locomotives classed Y6 by the L.N.E.R. were built in 1897 to the specification of Mr. J. Holden, then Chief Mechanical Engineer of the former Great Eastern Railway, specially for working on the Wisbech and Upwell Tramway in Cambridgeshire, and for the Ipswich and Yarmouth docks. These locomotives were remarkable in being housed in wood over the frames, so that they closely resembled teak-finished guards' vans. They had wheels 3 ft. 1 in. in diameter and inside cylinders as well as a centrally placed boiler. Controls were fitted at each end to minimise turning, and they originally had "cow-catchers" and a metal apron over the motion. This apron has since been removed and the two survivors now work solely on the Wisbech and Upwell Tramway No. 68083 of this class is illustrated, having passed through the Works and received the British Railways "lion and wheel" emblem.

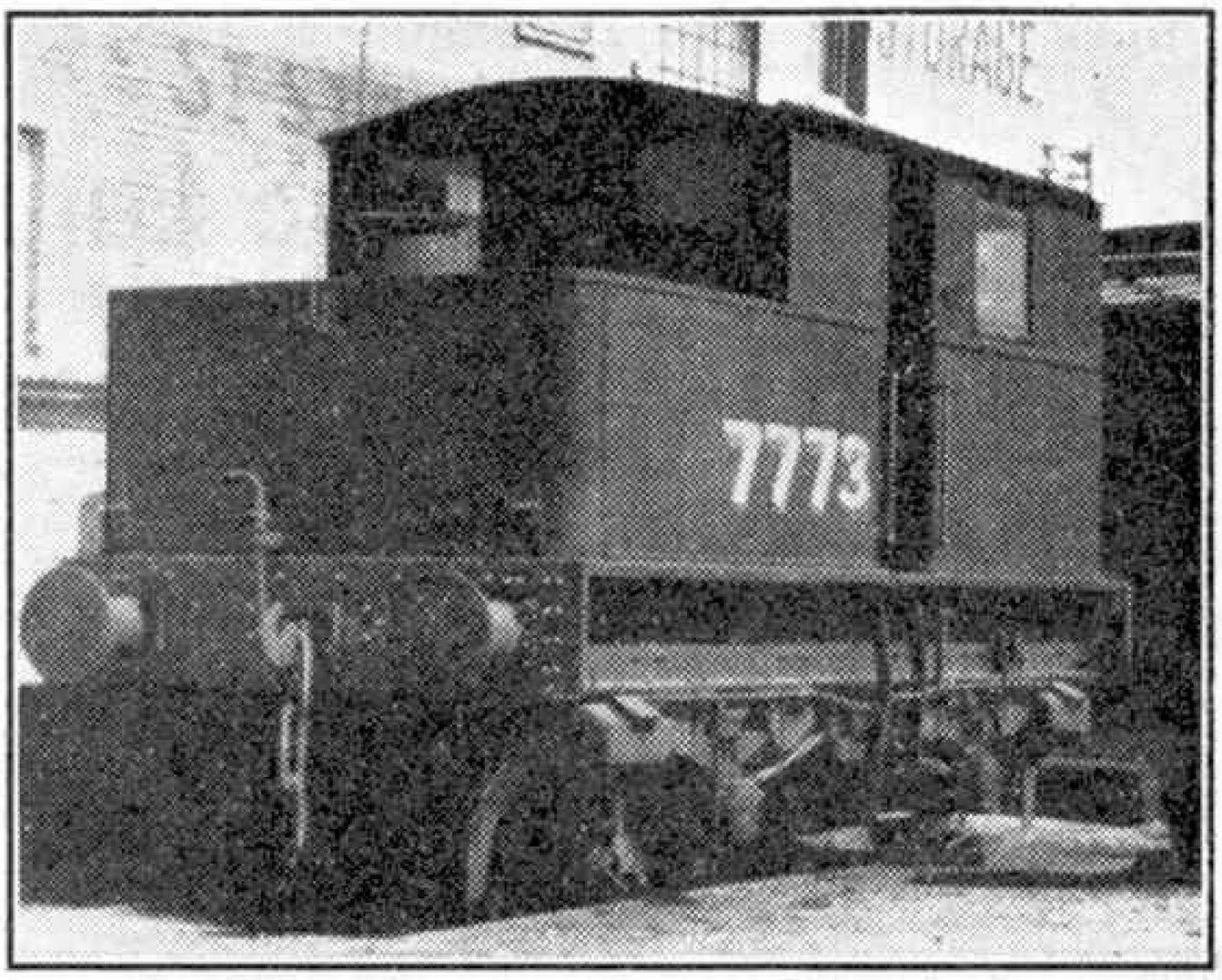
An improved "Tram" design, now class J70, made its appearance in 1903, and



Shunting at Ipswich, where the train has to cross a public road. A flagman watches the progress of one of the improved "Tram" engines of class J70.

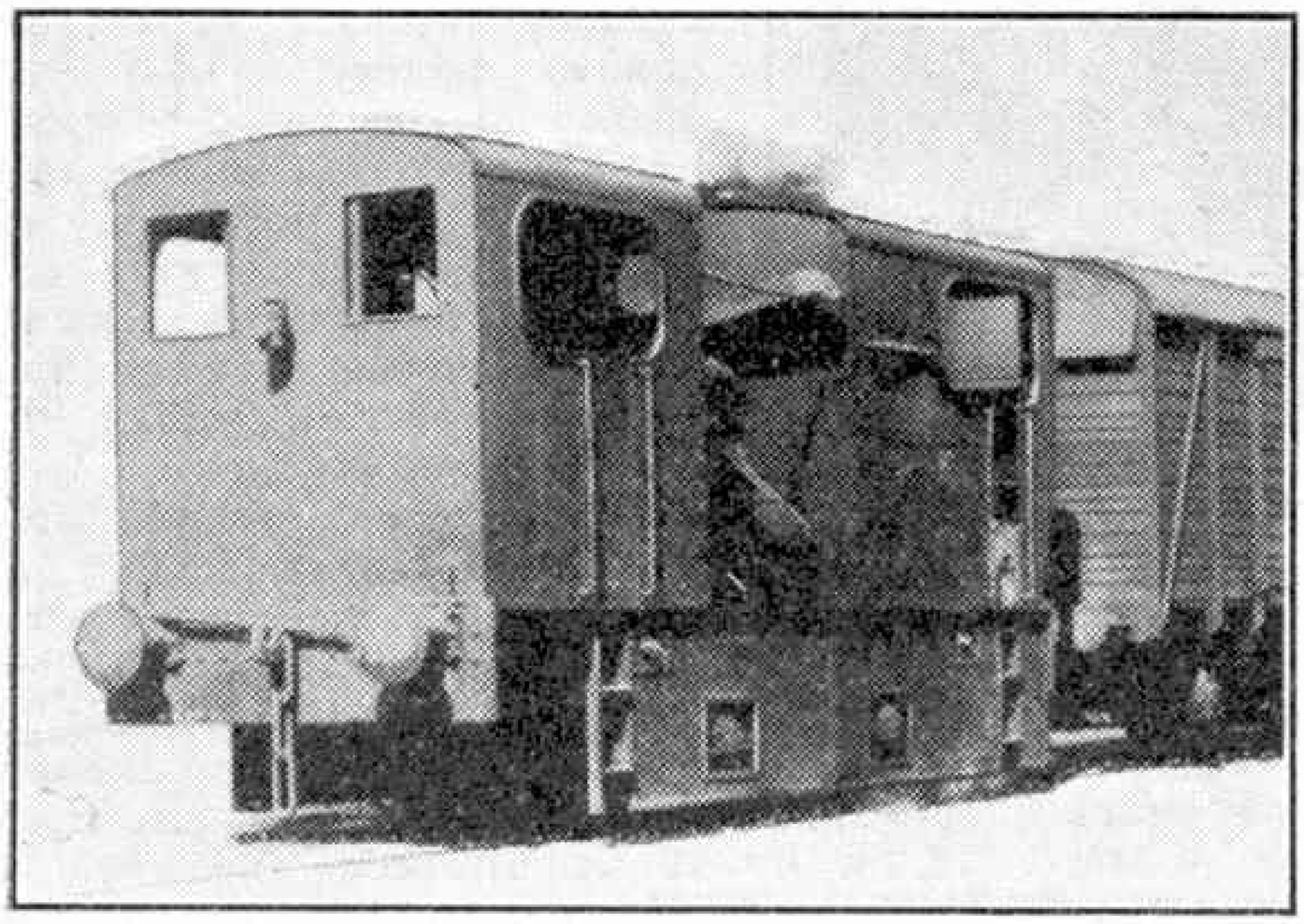
this is the class mainly used for shunting at Ipswich docks at the present time. It is six-coupled and has outside cylinders and Walschaerts valve gear. As on the earlier "Trams," cow-catchers and an apron over the motion were provided but the apron has now been removed. The stove-pipe chimney has a spark-arrester fitted to it. The lower illustration on the previous page shows a J70 crossing the road from the marshalling yard and the flagman standing in the middle of the road.

Another class, occasionally used, is the small J65 0–6–0 tank. This is modified, when working in the docks, by having the front coupling rods removed, thus converting it from an 0–6–0 into a 2–4–0 tank.



"Sentinel" locomotive No. 7773 at Lowestoft is used for duties in the Engineer's Yard and the docks.

Lowestoft has an Engineer's Yard close to the docks and this has members of two classes of "Sentinel" patent locomotives working around. These are 0–4–0 tanks of classes Y1 and Y3 with 2 ft. 6 in. wheels, inside cylinders and a vertical boiler having 275 lb. per sq. in. working pressure. These two classes differ mainly in that the ordinary "Sentinel" Y1 has a single speed gear while the "Super-Sentinel" Y3 has several gear ratios.



"Super-Sentinel" locomotive, now No. 68186, showing the double cab arrangement and shrouded wheels.

Sentinel No. 7773 of class Y1 shown at the end of the Engineer's Yard has rather an interesting numbering history. In 1941 an intermediate L.N.E.R. renumbering scheme was started to make way for the new B1 4–6–0s in the 8000 series. This was partially carried out when it was decided to renumber completely every L.N.E.R. locomotive. Sentinel No. 8401 was never recorded as having had its number changed to 7773, though this was actually carried out. At the end of January 1947 every locomotive was recorded as having been renumbered, but 7773 still carried its unrecorded intermediate number and, as far as is known, still does.

The other main dock area is at Yarmouth where many of the lines actually run along the sides of the streets. Once again, the engine bell is rung to warn pedestrians of a train's approach while a youth walks along in front with a red flag and sets the points as required. He also performs the work of a shunter when trucks are picked up at intermediate stops.

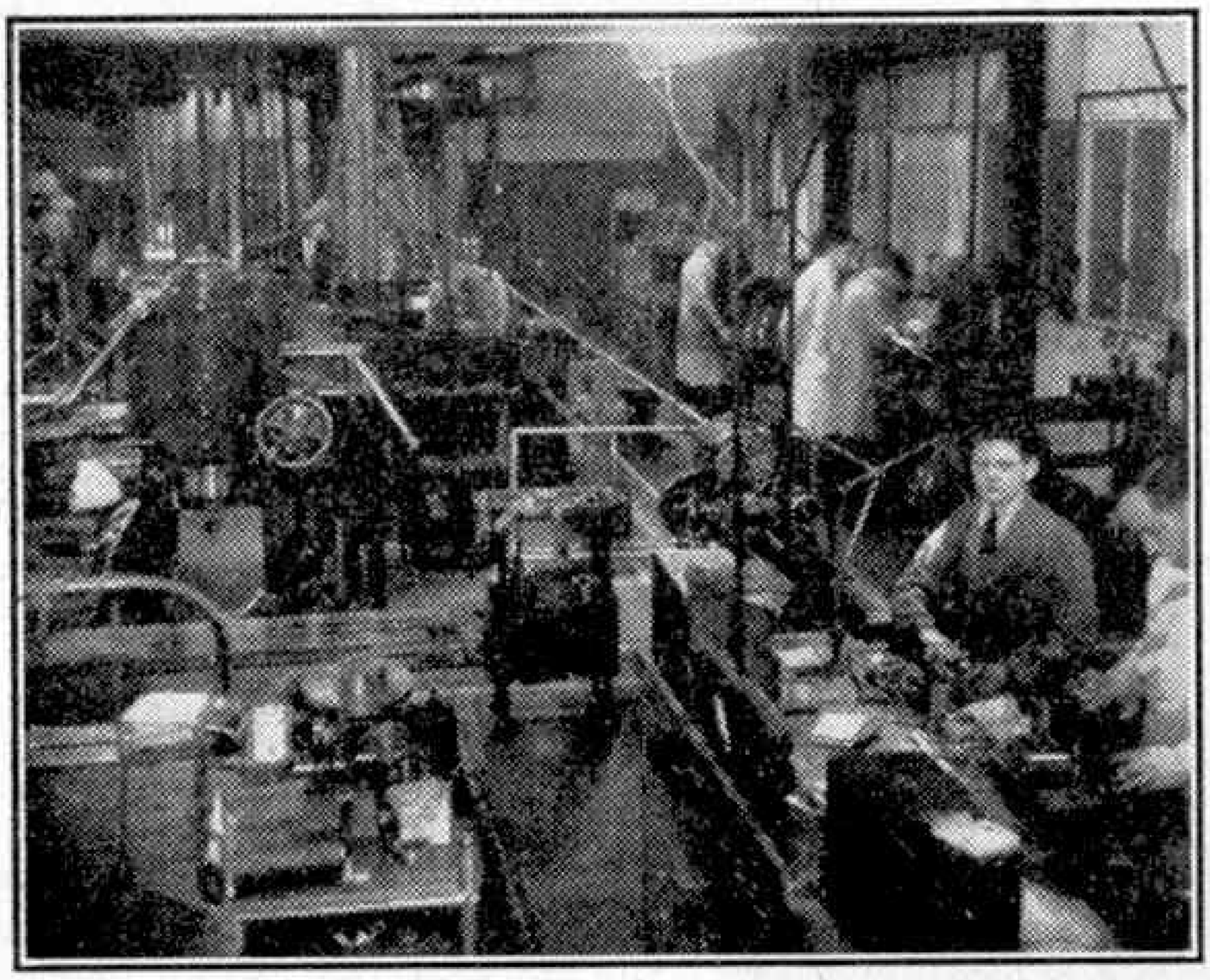
Until a year or two ago, two "Super-Sentinel" locomotives of the double-ended Y10 class were used here. These were originally built in 1930 for the Wisbech and Upwell Tramway, having the usual Sentinel features of high-pressure vertical boiler and gear drive. The driving wheels, which are completely covered in, are slightly bigger than usual, being 3 ft. 2 in. in diameter. One of these has now been withdrawn from service.

HOW THINGS ARE MADE:

Plastic Lenses

By W. H. Owens

AMONG the great variety of articles now made from plastic material are lenses for spectacles, cameras, magnifiers and scientific instruments. The chief advantage, though by no means the only one, of plastic lens over the glass kind is their safety. They cannot splinter, even when dropped on concrete, and they are also less than half the weight of glass. Thus plastic spectacles are most valuable for sportsmen and for those whose occupations involve the risk of accidents.



The stainless steel dies used in moulding plastic lenses are made to the highest precision standards by skilled tool makers and are highly polished. The illustrations to this article are reproduced by courtesy of Combined Optical Industries Ltd.

To test the safety of plastic lenses a weight was dropped on two sample lenses of exactly the same power, one plastic and the other glass. Results showed that the minimum height from which the weight broke the plastic lens was at least four times as great as that from which the glass lens was broken. The glass lens, of course, was shattered into innumerable sharp-edged fragments, but the plastic one was broken into just two or three large pieces, none of which had a sharp cutting edge.

Besides being perfectly safe and light in weight, plastic lenses have a further advantage over glass ones in that they are anti-fogging. Since the lens material has a low heat capacity and conductivity, such spectacles are much less subject to the fogging that normally occurs when the wearer passes from a very cold atmosphere into a warm and humid room.

Their one possible disadvantage is that they are softer than glass and therefore more liable to surface scratching if not treated with the recommended care. But even this is not such a serious drawback. When a glass lens is scratched it creates a sharp reflecting edge which definitely hinders vision. But in a plastic lens the mark is of a different nature and tends to scatter the light so that, unless the scratching is excessive, it is unnoticeable to the wearer.

The manufacture of plastic ophthalmic lenses is undertaken in Great Britain by Combined Optical Industries at Slough, Buckinghamshire. From this modern factory, which was opened a few years before the last war, lenses and magnifiers are now sent all over the world. During the war the firm supplied lenses to all the fighting Services, and exported over a million to Russia alone.

Plastic lenses are made from the thermoplastic material called methyl-methacrylate, or more simply Transpex I. This is specially prepared for the makers in cast sheets of optically homogeneous substance. The sheets range in size from 12 in. by 12 in. upwards, and vary in thickness from 5 mm. to $2\frac{1}{8}$ in., the thickest sheets being used for the making of magnifiers.

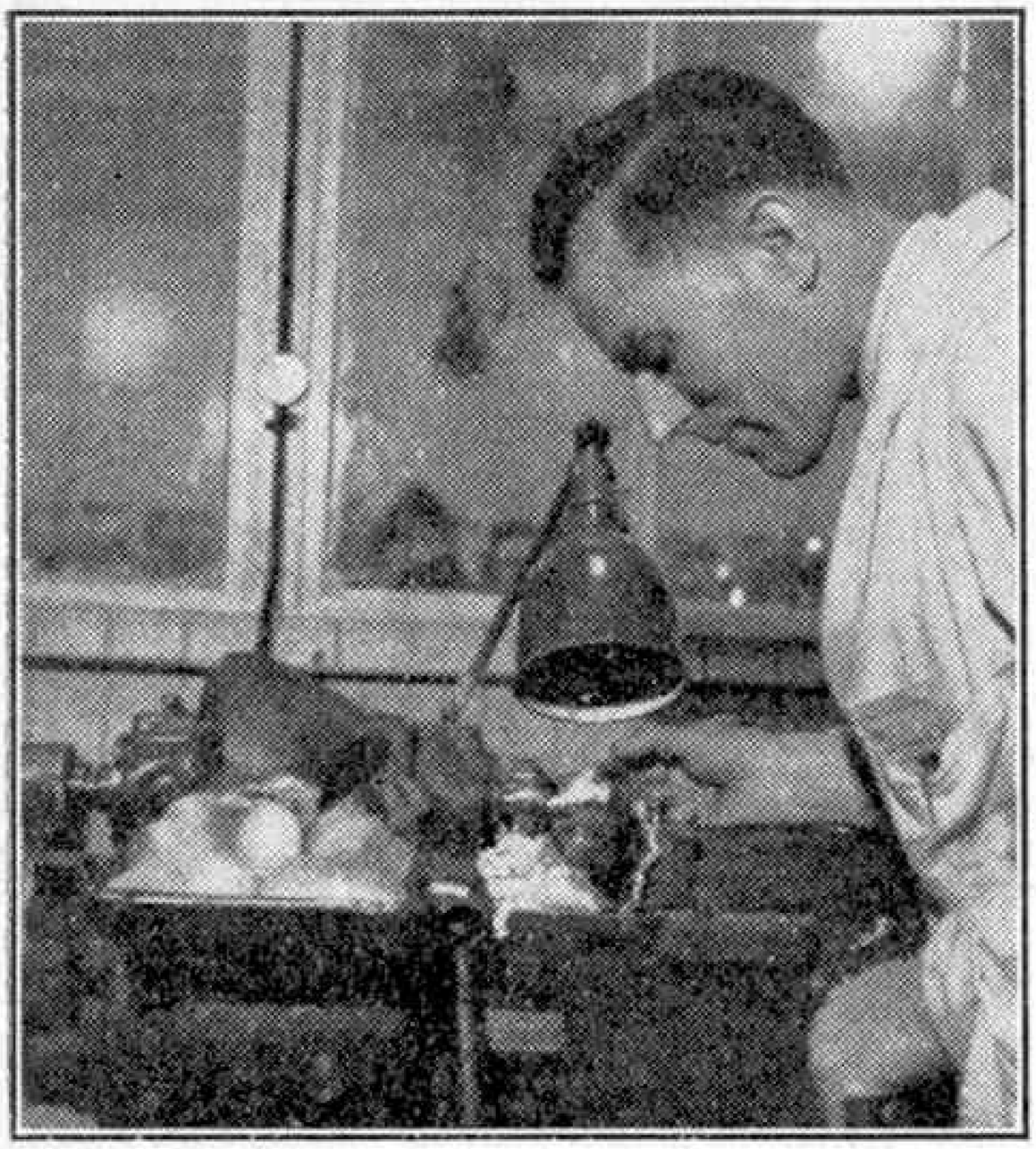
On the arrival of the sheets at the factory these are cut up into discs of the required size, which form the blanks for the lenses to be moulded under pressure. By an operation known as trepanning the discs are produced on a rotary cutting machine, which can turn them out at the rate of approximately 150 an hour. As each disc is cut the Transpex is moved into position automatically for the next,

and so on to the end of the sheet. The operator uses different cutters in the tool head according to the size of the batch of discs being trepanned.

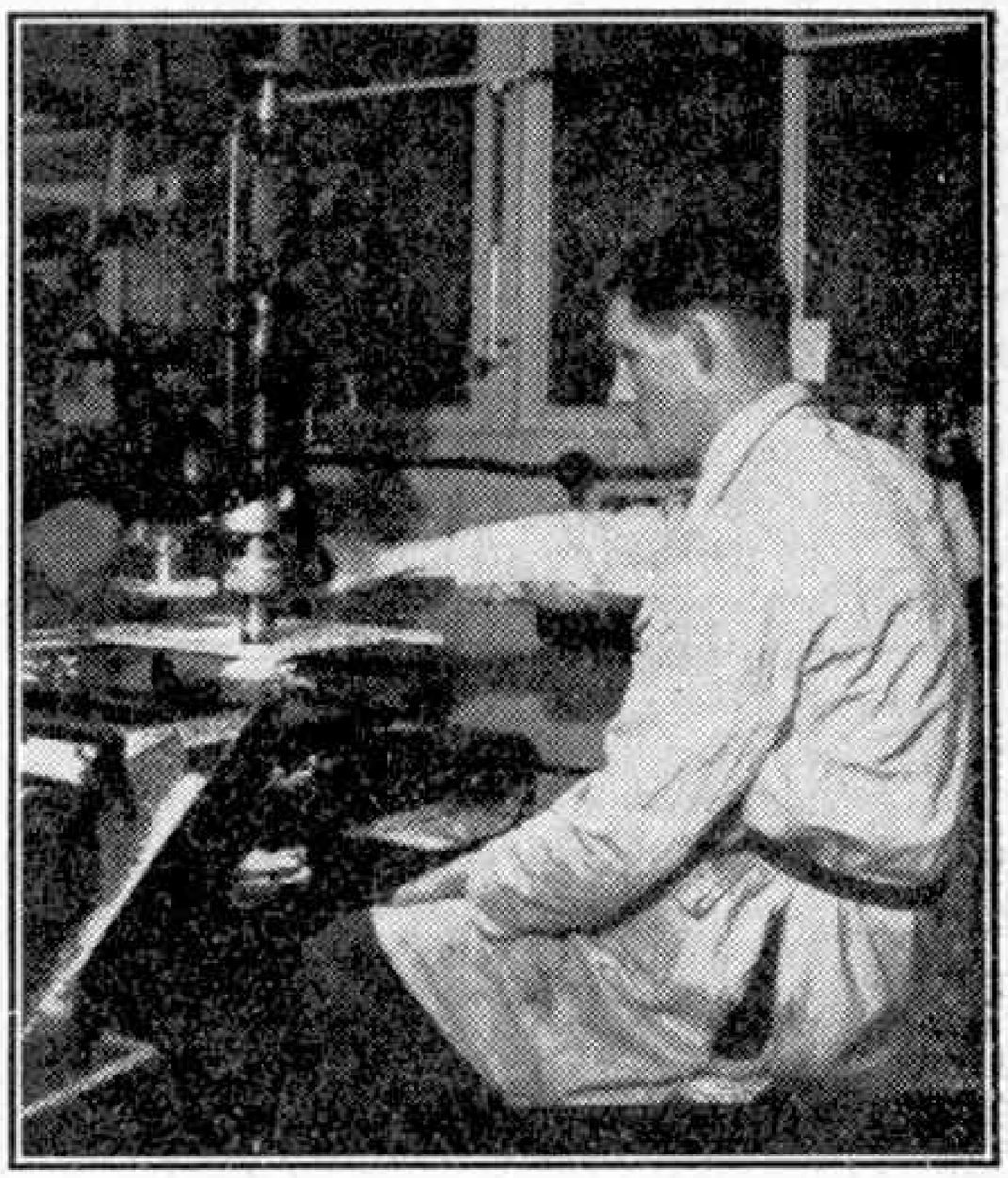
In the first stage of manufacture, the lens blank is placed in a machine that skims from one surface just a fractional layer of material. This removes any dirt, hairs or other foreign matter that may be in the surface. Then the other surface is "turned" in a lathe to a radius that corresponds roughly with that of the finished curvature of the lens.

The thickness and weight of the lens blanks are closely watched at this stage. Every one must conform to a calculated weight and thickness, and it is the turning operation that is responsible for this. The tolerances allowed are very small indeed. The blank is held securely in the lathe by a spring collet, and after turning, both surfaces are treated with a very fine emery paper to erase cuts and marks that are unavoidably made in the lathe.

The final treatment immediately before moulding is the buff polishing. The preformed lens is secured by suction to a loosely revolving holder and each surface is held against twin polishing wheels revolving at high speed, one of which applies a polishing soap. The buffing reveals the more obvious faults in the material and any turning marks that may not have come to light earlier.



The Transpex blank is turned in a lathe to preform the radius of the lens to be moulded from it.



Trepanning blanks from a sheet of the plastic material known as Transpex is the first step in making a plastic lens.

Most faults in the Transpex are merely surface ones; they are generally eliminated by the initial skimming or turning. But if the buff polishing shows the faults are embedded deeper, then the lens blank must be reworked. Naturally only perfect material can be moulded.

Moulding is the very important stage of manufacture during which the lens blank acquires the optical properties prescribed for it. The lens is moulded in an electrically heated, thermostatically controlled press between precision-cut dies made from stainless steel. Before further description of the moulding, however, a word must be said about the tool room of the factory where the dies are made. These dies are cut from the finest alloy steel, and from the preliminary grinding to the final lapping and polishing the work is done with a meticulous degree of accuracy in order to obtain the super-smooth surface that will be transferred from the steel to the lens in the moulding press. Although standard engineering and optical surfacing machinery are used, the quality of the finished die depends on the human skill controlling these processes.

After the steel is cut to the required size, the first operation is to grind the surface on one side, and to drill and tap a small hole in the reverse side. This hole is for the purpose of securing the die during moulding. Next the

rough die is turned to a diameter slightly oversize of the completed article and, by further turning, a rough curvature is put on its optical surface.

There now follows the steel hardening process in a heated oven. Great care must be taken that the steel is hardened to exactly the right degree, otherwise faults may develop in the die and it will fail to give the perfect performance demanded of it. By precision grinding, the die is made absolutely true to all dimensions and the radius of curvature, according to the optical prescription, is put on it. Before leaving the tool room every die is engraved on the reverse side for identification purposes, with details of its power, radius and serial number.

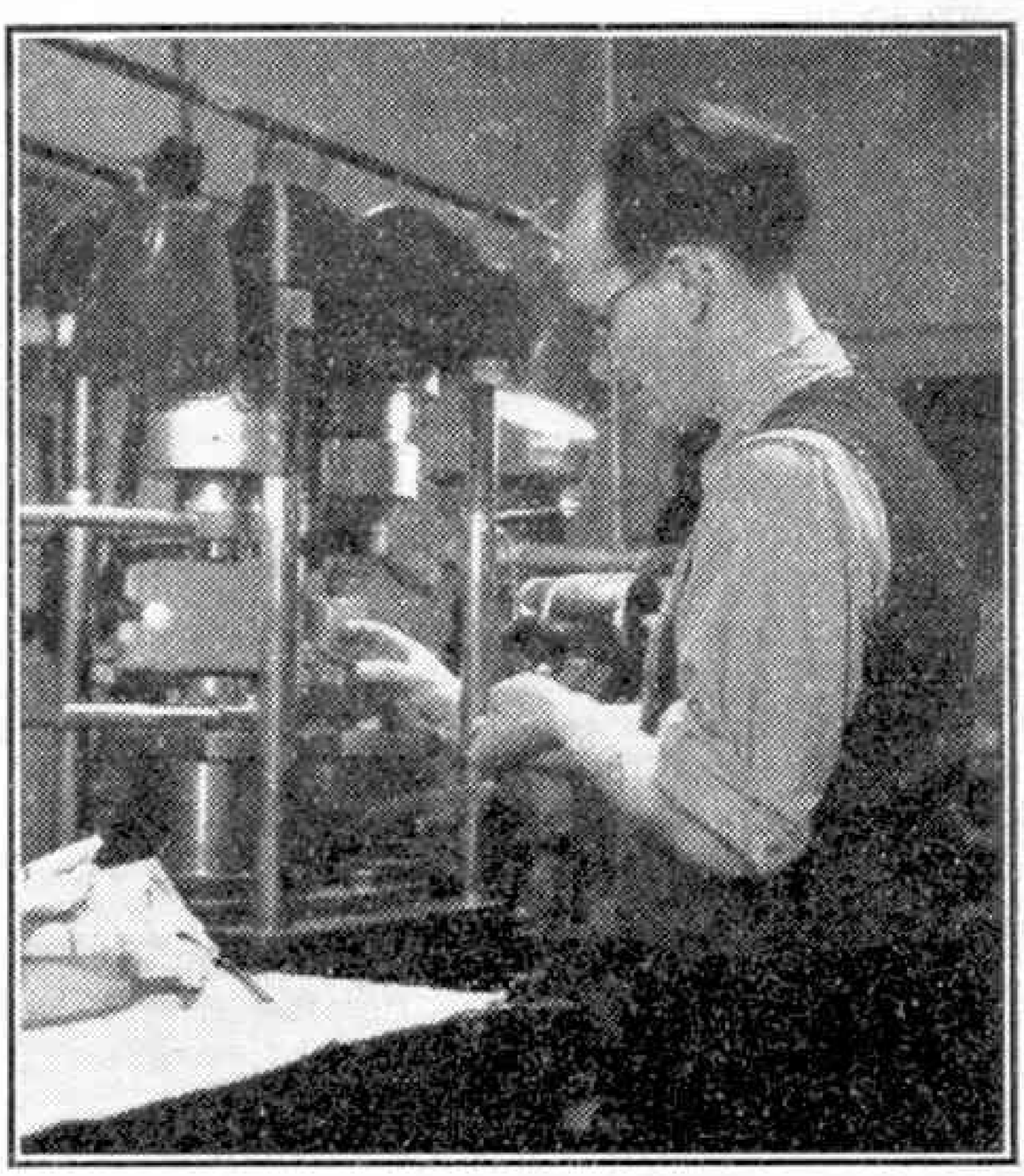
From the tool room the die passes to an adjoining workshop for lapping and polishing. Here it is worked by using optical methods and tools, beginning by lapping with carborundum powders on cast iron tools, following with finer emery powders, and in the latter states polishing with rouge on pitch covered laps. During the lapping processes the curvature is checked by the use of gauges, and when the die begins to assume a polish the tests for curvature are made by microscopes. When finished, the die has a lustrous black polish on its moulding surface.

Once a die is made any number of lenses, all identical with each other, can be produced from it. Every die is kept in store at the factory for use as required, and it has a log sheet of its own so that a detailed record may be kept of its performance and wear. Dies last a long time, but when they become worn with frequent use they are returned to the tool shop for repolishing.

In the moulding operation the mould and the lens preform, or blank, are separately pre-heated in little electric ovens to a temperature of 110 deg. C. Then the lens is placed inside the mould and subjected to a pressure of approximately 4,000 lb. per sq. in. Moulding may take anything up to 10 minutes, depending on the thickness, the power and the type of lens. Bifocals, for example, require longer than the plain spherical type.

At various stages of manufacture routine test and checks are made to ensure the accuracy of the finished product. When a consignment of lenses is about to be moulded the first to come off the press undergoes a searching test for power and axis. This is done with the aid of a focimeter, an instrument that records the dioptric power, axis etc. of the lenses, to a meticulous degree of accuracy. Not until this lens is passed as satisfactory by the checker is the moulding of the remainder continued. If the first lens is moulded perfectly all the rest will be likewise. Even so, periodical re-checks are made.

After moulding, skilled girl operators trim off the flash which the lenses acquire



Moulding the lens from the preformed blank is carried out in stainless steel dies at a temperature of over 100 deg. C. and under a pressure of about 4,000 lb. per sq. in.

in the press. Then each lens is carefully washed in warm soapy water, dried on soft material to avoid scratching and, finally, thoroughly inspected for faults.

Because of their safety and light weight, plastic lenses lend themselves admirably to the modern rimless type of spectacles. They can be finished in quite a variety of attractive shapes that greatly enhance the appearance of the spectacles when worn.

In addition to spectacle and scientific lenses, a range of lightweight magnifiers is also produced by the firm. This includes a popular and inexpensive stamp magnifier, made in three different sizes, which has been in great demand by philatelists for many years, as well as a wide range of spherical, aspherical and cross cylinder readers and magnifiers.

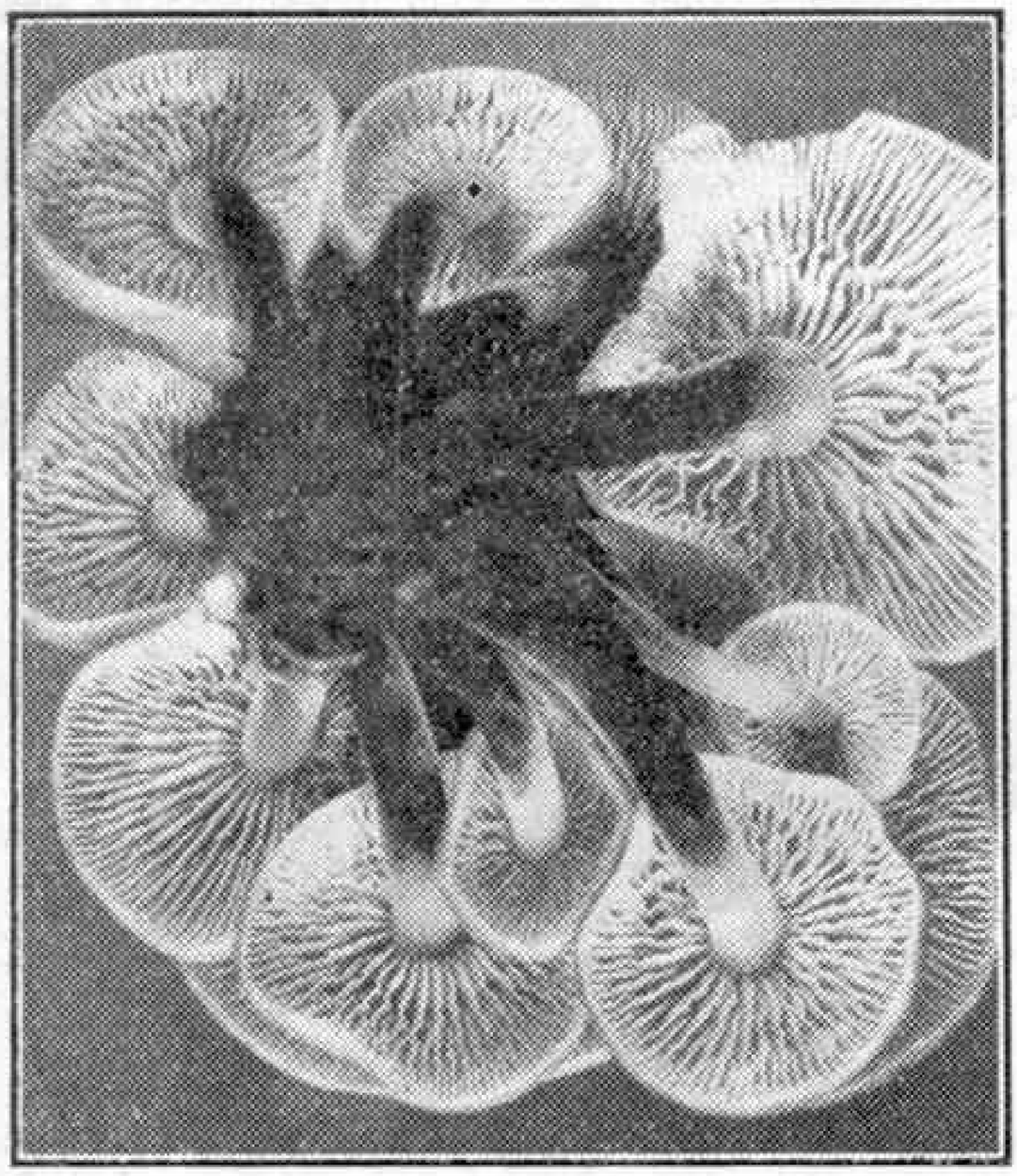
All these magnifiers are designed to give the widest possible field of view, clear definition and freedom from distortion.

Photography

Toadstools

By E. E. Steele

THIS month brings to life a vast amount of those curious plants, the fungi, the larger groups of which are usually lumped together and commonly called "Toadstools." These plants spring everywhere from decaying vegetation and have the most diverse shapes,

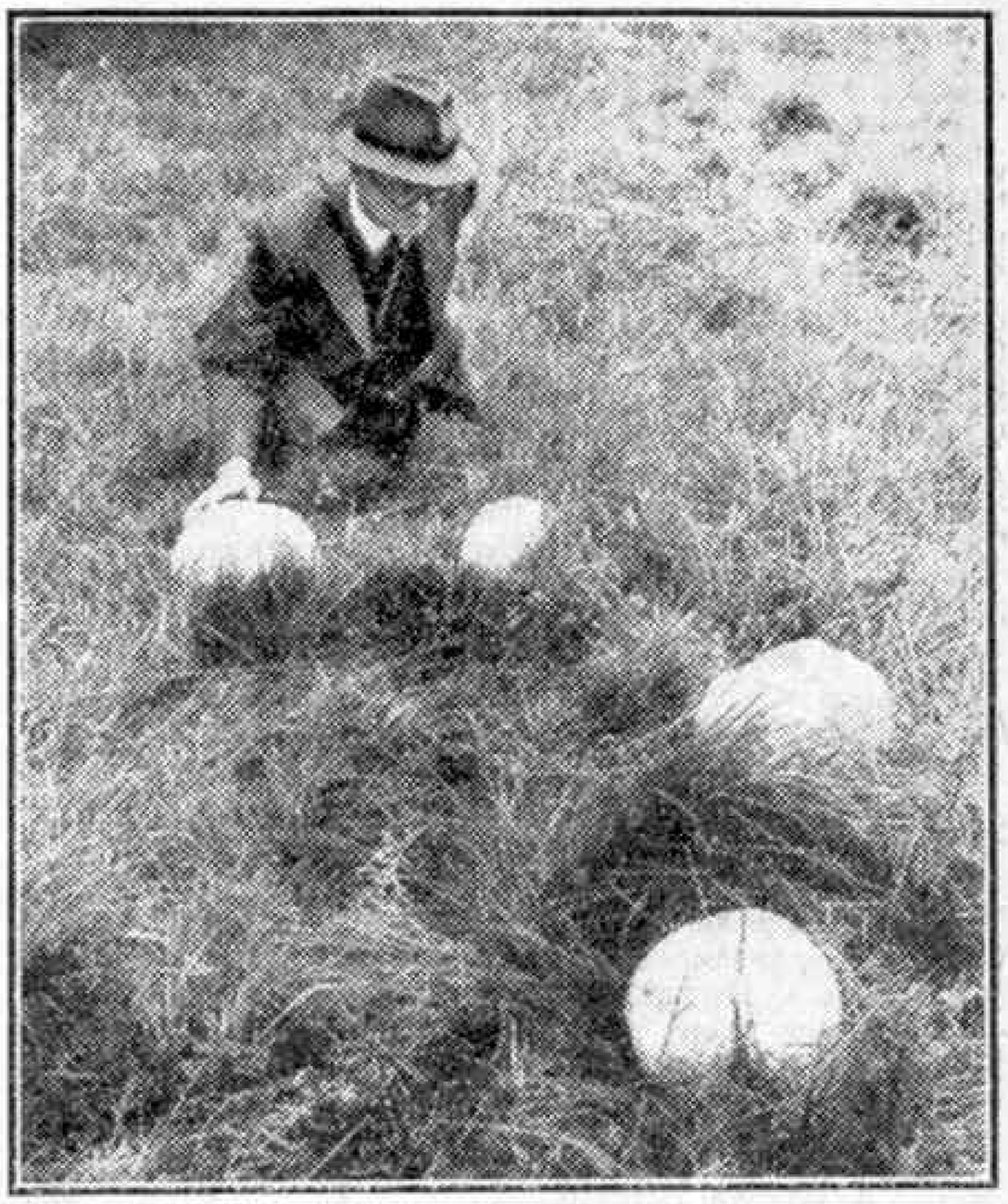


Fungus pattern.

some resembling horns and trumpets, some round and growing to the size of footballs, others appearing like fairy-cups, while some grow as huge leathery brackets from the trunks of decaying trees. Many of these are decked out in the most gorgeous colours, blue, violet, yellow, orange and red being quite common.

The best hunting ground for toadstools is undoubtedly the woods, where the carpet of decaying leaves seems to provide the right nourishment for the needs of the fungus. Actually the toadstool is the fruiting body of the plant just as the ordinary plant bears its flowers to produce seeds. The roots of the fungus are like threads of cotton-wool, mostly invisible under the soil. The seeds are called spores and are born on the under surface, or in the interior as in the puff-ball. If this is squeezed when ripe, the spores shoot out like a cloud of dust. If a ripe toadstool is placed with gills underneath on a sheet of paper and left for a few hours, the falling spores will form a pattern of the gills.

When photographing toadstools on the leafy floor of the wood it will mostly be necessary to support the camera on a tripod as exposure may require a second or longer, as lighting is poor, and the lens may need to be stopped down to gain as much depth of focus as possible.

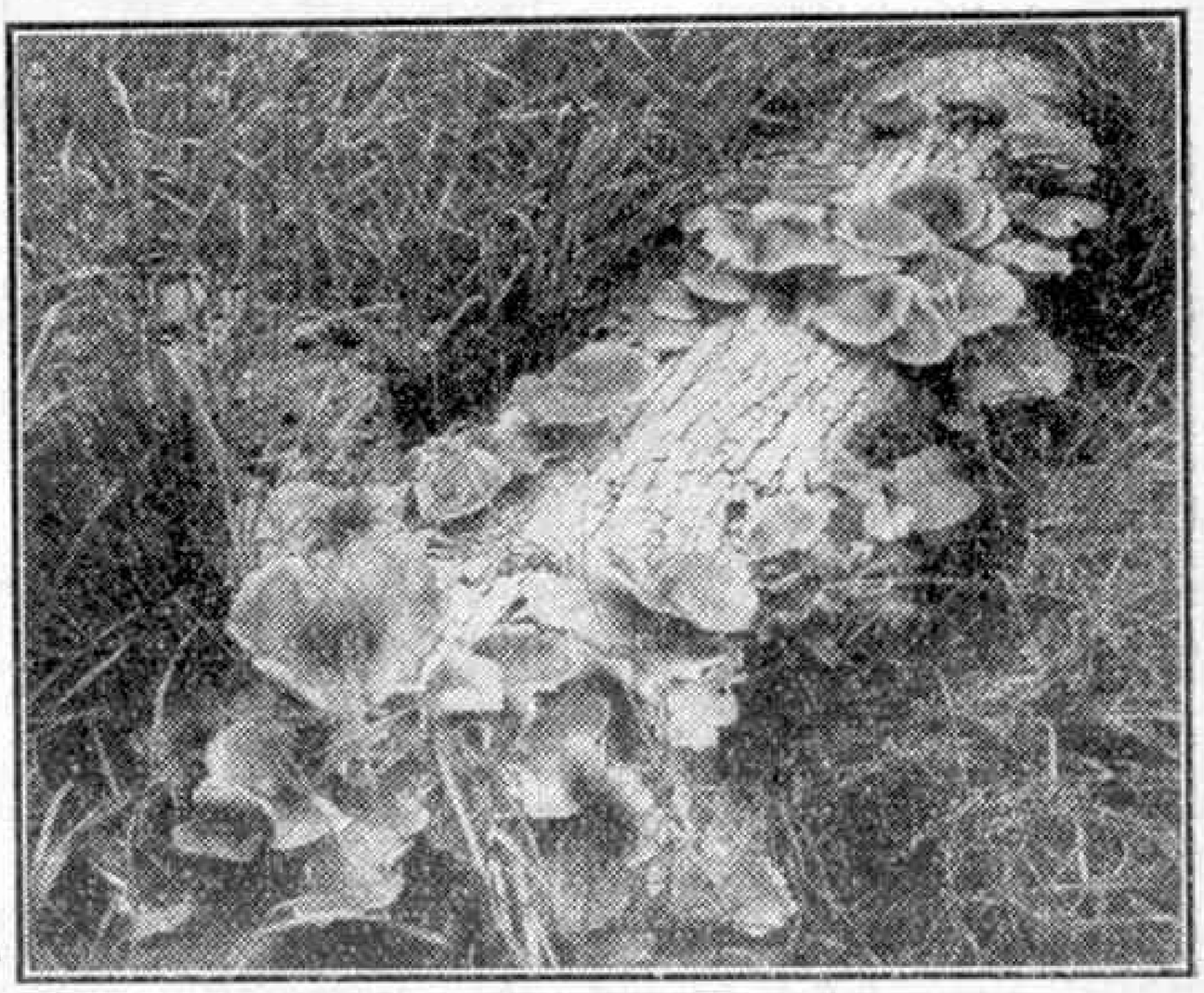


Giant puff-balls. The illustrations to this article are by the author.

When photographing fungus growing on trees in the wood the camera may be held steady by leaning against a convenient tree. Often better lighting and arrangement can be found by looking for toadstools growing on trees which have fallen by the side of country lanes, or in open park.

An interesting specimen is the "Bird's Nest" fungus, often found among decaying plant stems or twigs in the garden. It is only about half an inch in diameter and contains little round bodies which have a remarkable likeness to eggs in a nest.

Many of these toadstools are edible, but a few are poisonous and care should be taken not to eat any unless one is perfectly sure it is alright. The deadliest of all, the "Death Cap" (*Amanita phalloides*) has whitish gills, and a collar at the base.



Oyster fungus on fallen apple tree trunk.

Air News

By John W. R. Taylor

World's Fastest Fighter

The Hawker P.1067 single-seat swept-wing interceptor fighter, first details of which were released recently, is almost certainly the finest and fastest machine of its type in the world. Externally it is very similar to the P.1081 experimental aircraft, which was illustrated in the May 1951 "*Air News*"; but it is larger and has a Rolls-Royce "Avon" engine, which develops far more power than the P.1081's "Nene."

The P.1067 was produced under the design leadership of Sydney Camm, creator of the superb "Hurricane," "Typhoon" and "Tempest" fighters of World War II, and the Royal Navy's new "Seahawk" jet fighter. The fact that it was ordered in quantity by the Royal Air Force "off the drawing board," before the prototype flew, is the best testimony to its qualities. Details of its performance and armament are still secret, but they will certainly be in advance of anything seen previously.

A British Airship

The first British airship built since the tragic loss of the R.101 in 1930 made its maiden flight on 19th July last from the R.A.F. balloon centre at Cardington, Beds., piloted by Capt. J. A. Beckford-Ball.

Named "*Bournemouth*," it has been built by members of the Airship Club formed by Lord Ventry, and is about twice as big as a barrage balloon. Its envelope is 108 ft. long, with a capacity of 45,000 cu. ft., and it is powered by a 65 h.p. Salmson engine. Top speed with four people in the car is expected to be 40 m.p.h.

Fewer Private Owners

The U.S. Civil Aeronautics Administration have discovered that there are hardly any private pilots left in America. Altogether the Administration have some 60,000 civil, non-airline aircraft on their register. Of these 35,000 are being used for training, air survey and charter flying; 10,000 are owned by ranchers and farmers; 5,000 are equipped for crop-spraying and dusting; 3,000 are operated by Federal or State governments; 2,800 are owned by petroleum industries and 2,000 used by transportation and public utility companies for survey work. This leaves a mere 2,200 for pilots who use their aeroplanes solely for pleasure.

Swift Service

At 8.40 p.m. one Saturday B.E.A.'s Freight Department received a telephone call from a private charter company whose "Tudor" transport was grounded at Rome awaiting an engine replacement, asking if the Corporation could fly out a spare engine for them and, if so, how quickly?

Within a matter of minutes the 1½-ton "Merlin" engine was on its way to Northolt, where it was loaded on to a B.E.A. freighter, which delivered it at Rome Airport at 9.10 a.m. the next morning.

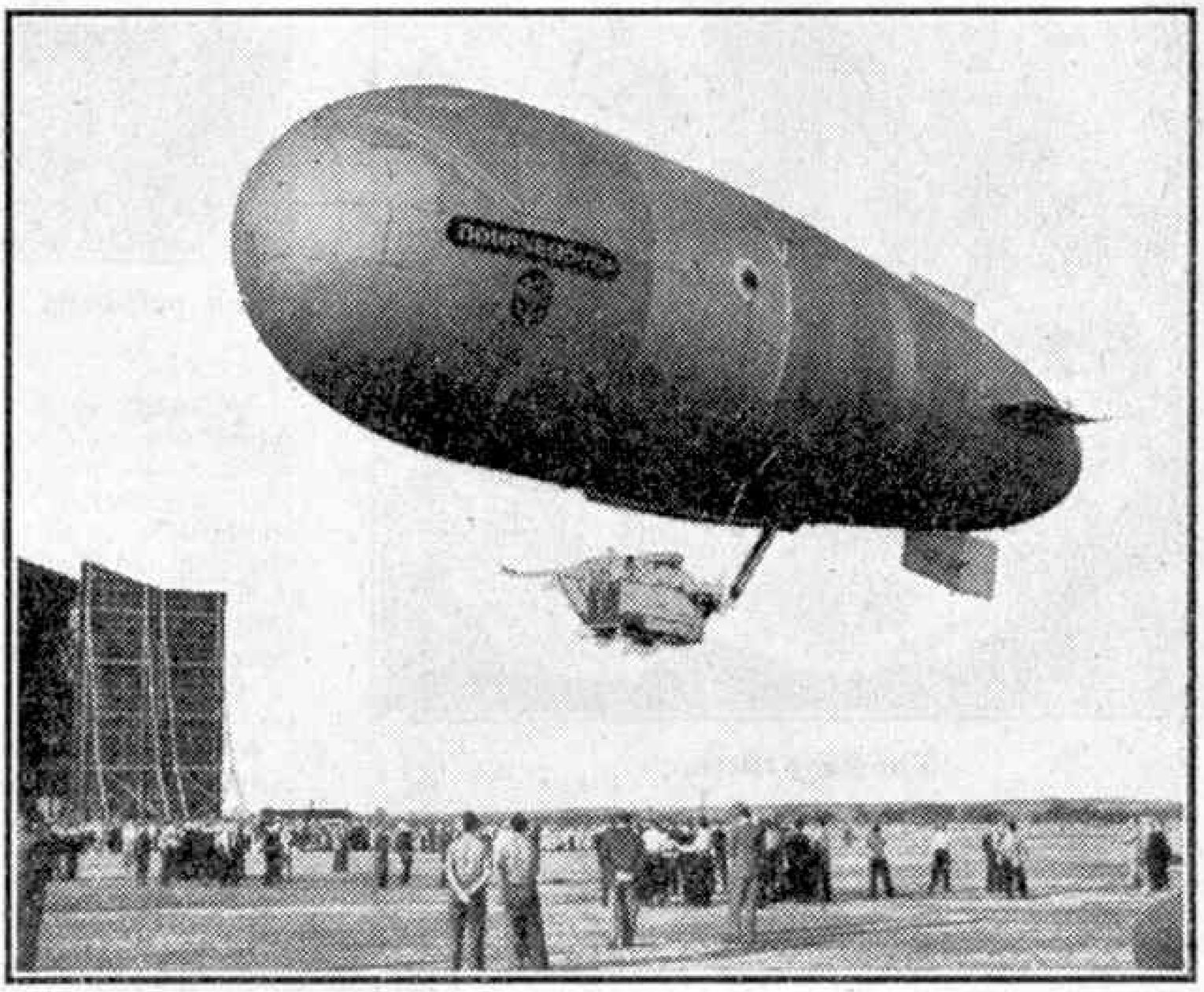
France to Build "Venoms"

As forecast last month in my article on French aviation, the de Havilland "Venom" is to be built in France by the S.N.C.A.S.E. Company, who are at present turning out D.H. "Vampires" for the French Air Force. Production will be concentrated at first on two-seat "Sea Venoms" for the French Navy, but there is little doubt that the French Air Ministry will be attracted by the "Venom's" greatly improved performance compared with the earlier "Vampire."

Famous Pilot Retires

Capt. J. (Mutt) Summers, one of Britain's finest present-day airmen, has retired after 22 years as Vickers' chief test pilot. He joined the company in June 1929, after three years test-flying with the Royal Air Force, and has made no fewer than 54 first flights since then, all in Vickers' aircraft. Among them were the "Wellesley," which captured the world's long-distance record in 1938, the "Stranraer" flying boat, "Walrus" amphibian, the "Spitfire" and "Wellington" of World War II, the post-war "Viking," "Valetta," "Viscount," "Varsity" and the new four-jet "Valiant" bomber.

Capt. Summers, who will remain with Vickers as Chief Liaison Officer, has been succeeded by G. R. Bryce and Lt. Cmdr. M. Lithgow, who become chief test pilots at Vickers' Weybridge and Supermarine Works respectively.



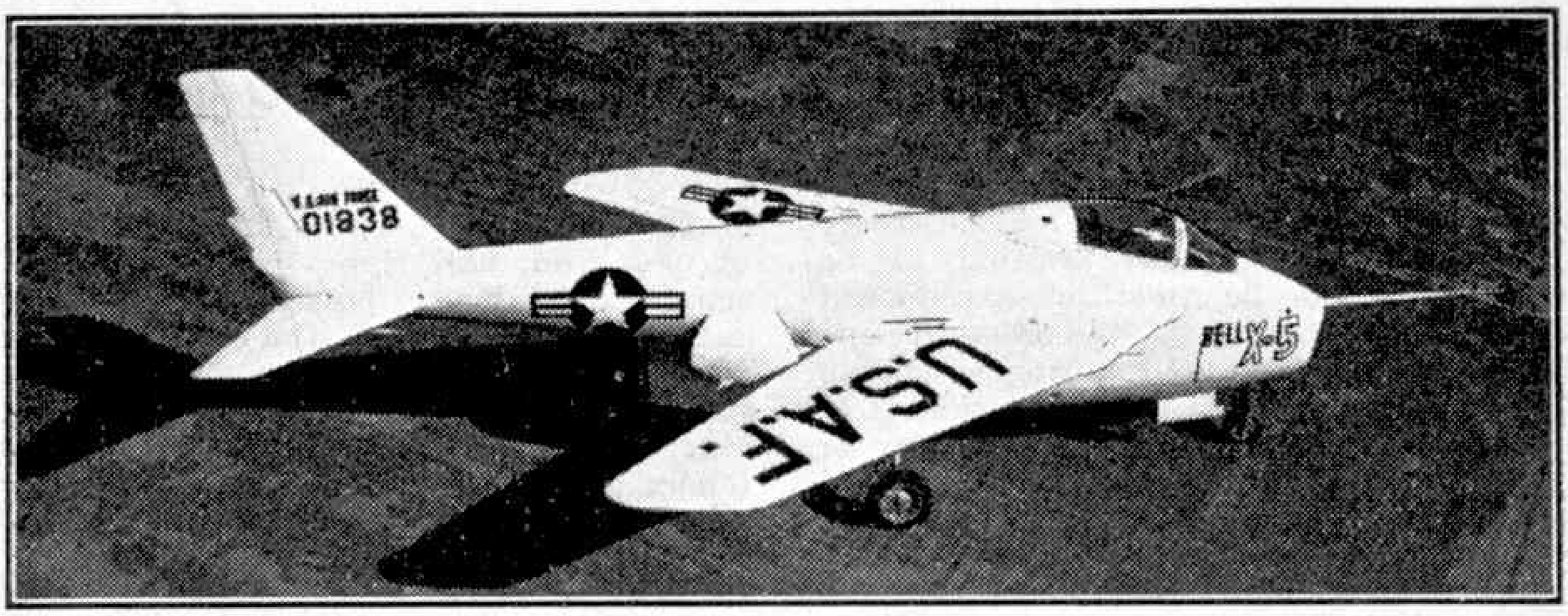
The British non-rigid airship "Bournemouth" making her maiden flight at the R.A.F. balloon centre, Cardington.

"Comet" Record

An indication of the way the "Comet" jet liner will cut world airline schedules when it comes into full service next year was given recently when one of the prototypes flew from London Airport to Johannesburg in 17½ hrs., manned by a B.O.A.C. crew. The normal B.O.A.C. "Hermes" service over the 6,218-mile route to South Africa takes 34 hrs. 39 min.

A Costly Cargo

A Trans-Australia Airlines "Dakota" recently flew from Melbourne to Sydney filled with 74 packages of Australian art treasures, worth £30,000. They belong to the National Gallery trustees in Melbourne.



The new Bell research aircraft X-5 has wings that can be moved forward and backward during flight. Photograph by courtesy of the Bell Aircraft Corporation, U.S.A.

New Research Aircraft

Following their successful X-1, first aircraft to exceed the speed of sound, Bell Aircraft have built another revolutionary high-speed research aeroplane designated the X-5, fitted with wings which can be moved backwards and forwards by the pilot during flight. The purpose of this variable sweepback is to enable the pilot to take off with the wings in the forward position, to give the best possible lift and controllability, and then to change over to a much greater sweepback for high-speed flying at altitude.

In other respects the X-5 is a comparatively orthodox aircraft, powered by a 4,900 lb. thrust Allison J-35 jet engine, compared with the X-1's 6,000 lb. rocket motor. Unlike the earlier aircraft, which was usually launched in mid-air from a "Superfortress," the X-5 will take off under its own power and will be able to fly for much longer periods. Fully spread, its wings span 32 ft. 9 in. and it is 33 ft. 4 in. long, plus a further eight feet if one counts the yaw-meter and pitot tube extending forward from its nose.

B.E.A.'s Millionth Passenger

British European Airways are carrying passengers at the rate of 1,000,000 a year. To celebrate this milestone, the "millionth" passenger, two-year-old Adrian Cumming, was greeted at Northolt Airport by B.E.A.'s Chairman, Lord Douglas of Kirtleside, who presented him with a teddy bear.

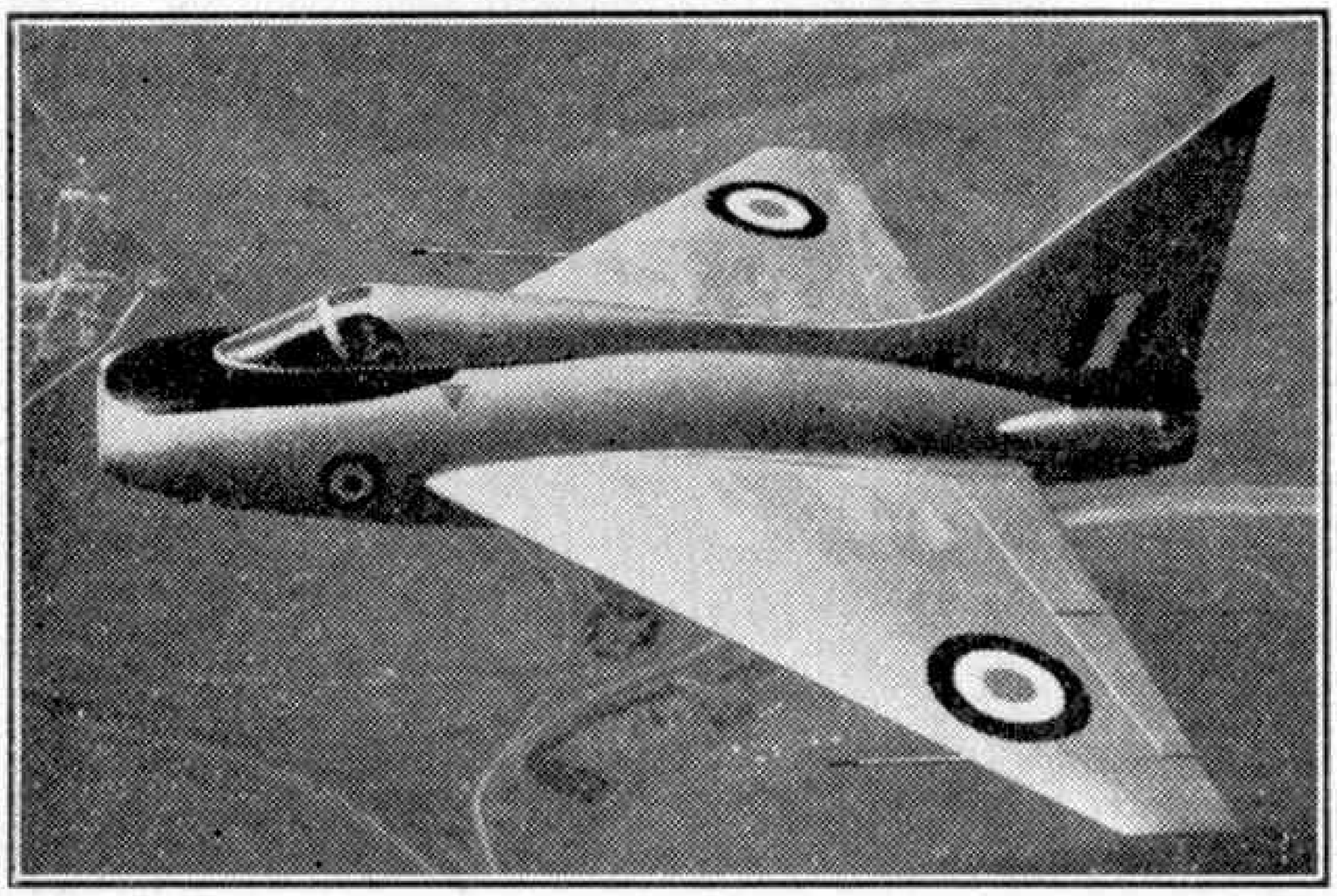
British European Airways are now the seventh largest airline in the world, in terms of passengers carried, the first six being American.

"Canberra" in a New Role

A new version of the English Electric "Canberra," designated the PR.3, will shortly come into service with the Royal Air Force for high-speed, high-altitude photo-reconnaissance duties. Its appearance underlines the usefulness of the "Canberra," which already exists as the B.1 two-seat unarmed high-altitude bomber, the B.2 low-level three-seat tactical bomber, and the B-57A night intruder aircraft which is being built under licence in America by the Martin Company for the U.S. Air Force.

"Unwelcome Intruders"

A pilot ferrying a Percival "Proctor" light 'plane from Queensland to Bankstown, New South Wales, some weeks ago, literally stirred up a hornet's nest. Apparently the hornets had decided to make their home in the carburettor air intake. This did not affect the engine during ground running, but as soon as the "Proctor" was airborne the nest came loose, fell on to the carburettor choke tube and stopped the engine. Fortunately the pilot was able to make a safe landing.



Boulton Paul P.111 Delta-wing research aircraft, built as part of Britain's programme of high-speed flight research. Photograph by courtesy of Boulton Paul Aircraft Ltd.

Another Delta

Proof of Britain's determination to maintain her leadership in jet research is the fact that three types of delta-wing aircraft are now flying in this country. The Avro 707 and Fairey F.D.1 have already been illustrated in "*Air News*," and the adjacent photograph of the Boulton Paul P.111 completes the series. It is about the same size as the Avro 707, with a wing span of 33 ft. 6 in.; but its "Nene" engine gives 2,000 lb. more thrust than the "Derwents" of the other two machines.

Initial fears that deltas might be difficult or even dangerous to fly seem to have proved groundless, and British designers foresee a big future for high-speed delta fighters and bombers.

The Scrapping of Locomotives

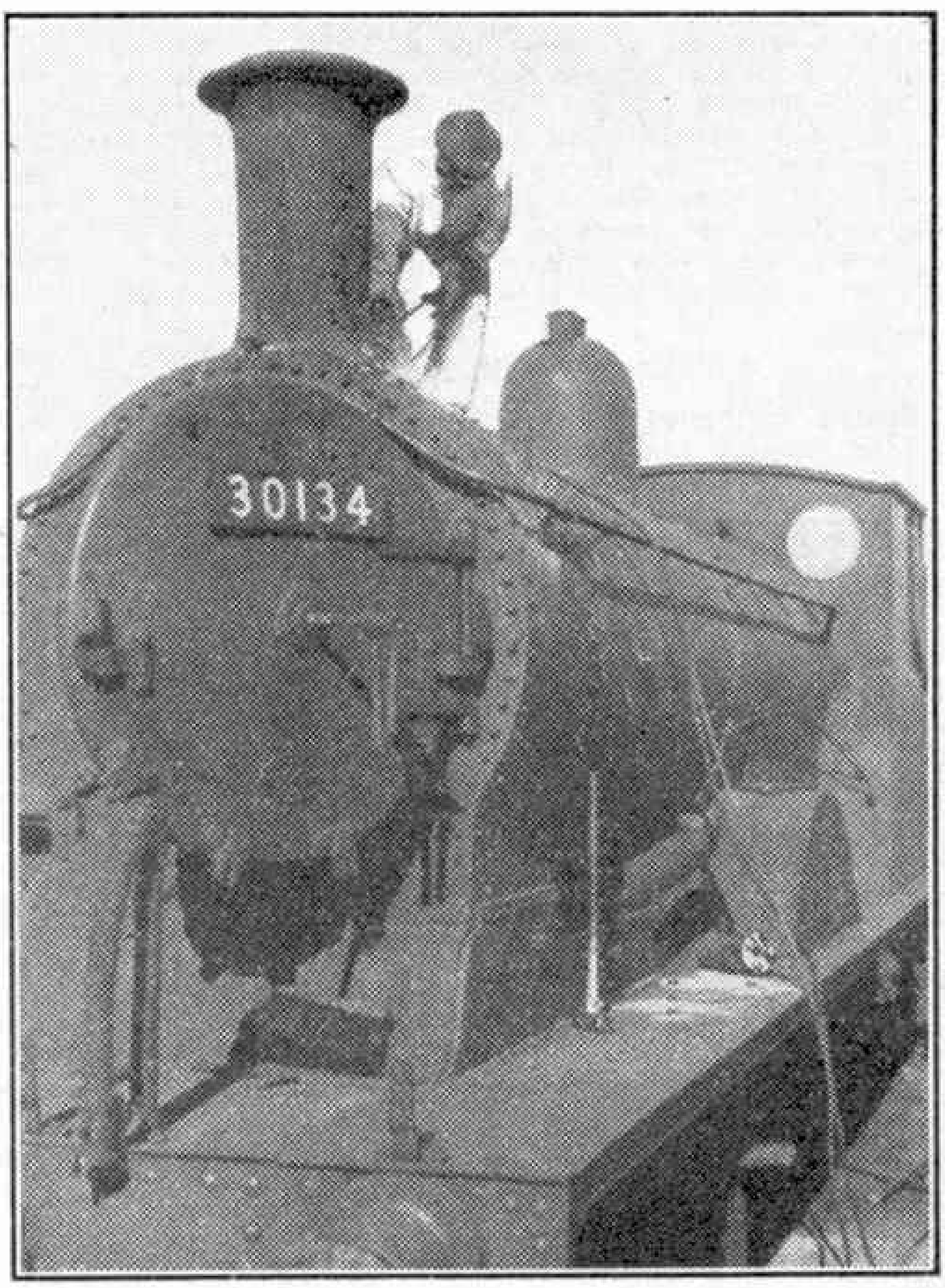
By "Shed Superintendent"

IT is always a sad sight to see old, rusty locomotives forlornly waiting to be scrapped, or as the Americans say queued up for the "blow-torch," the oxy-acetylene cutting apparatus used during scrapping operations. By way of consolation it is amusing to speculate upon the future of the metal which will be sold and melted down for use again. Some of the steel may find its way into new locomotives, so that new engines will arise from the ashes of the old ones. It is more likely that it will be used for making something entirely different; even for Meccano Parts. Who knows?

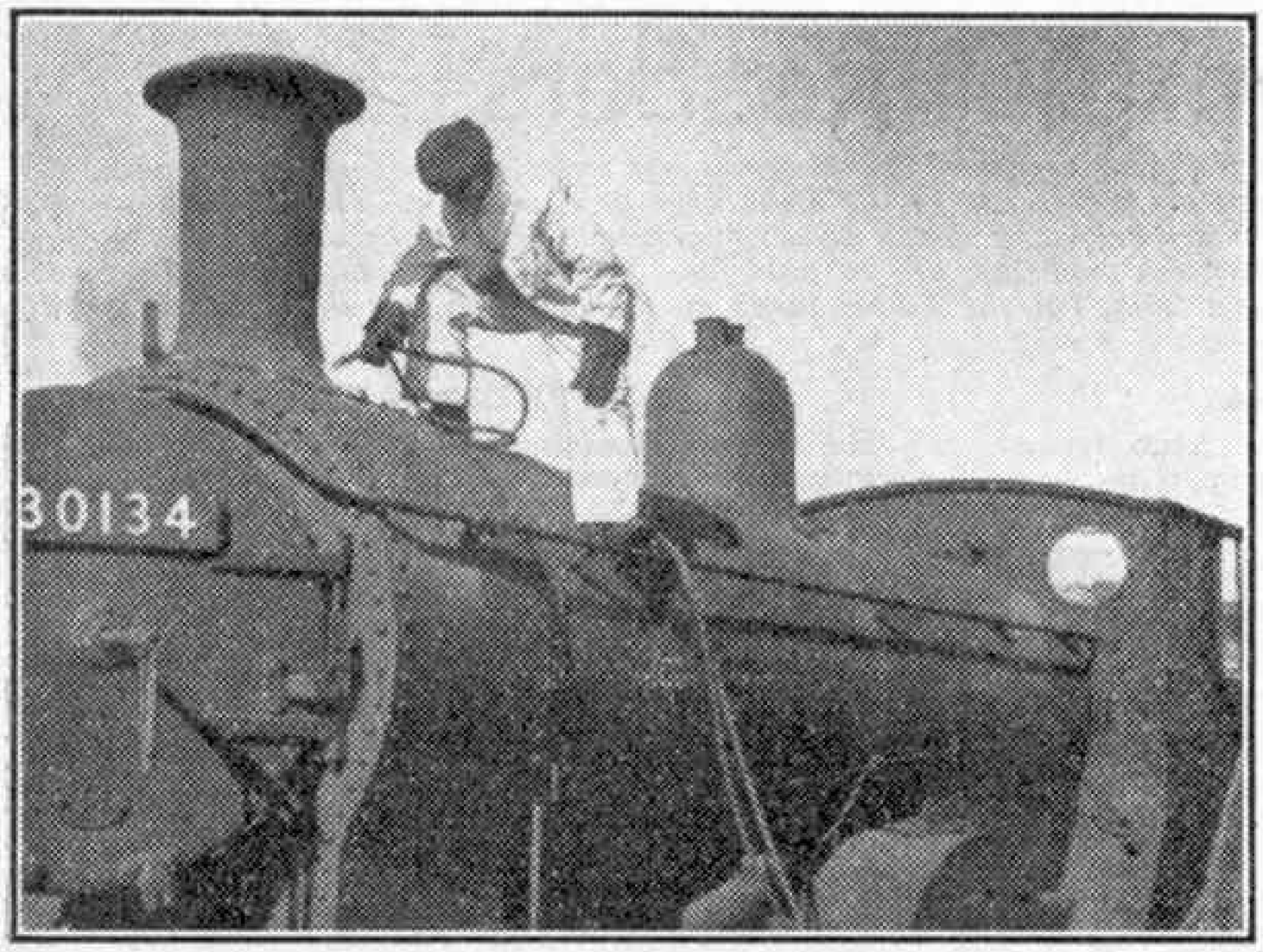
Engines are earmarked for scrap a long time before they reach the final stages. Decision may be made to abolish a whole class or type of engine, on various grounds—age, unsuitability for modern traffic, numerical inferiority or non-standard design. Usually, when new locomotives are built, a similar number of old ones is marked down for disposal. If the old ones are of a type that can be sold intact, such as small shunting engines useful in private sidings, they are put up for sale "as found," in the condition they happen to be in at the time of sale. Otherwise, engines listed for scrapping are allowed to run until they are worn out; but even then each engine may not be entirely cut up. Certain parts, such as crank axles, for example, will be preserved if in good condition, and another engine of the same type, which may suffer a broken axle but is not worn out in other respects, will have the good axle transferred to it. This cannibalisation process is carried on until there is no further object in retaining any spare parts.

The initial stage in the scrapping procedure is the removal of all special fittings, such as mechanical lubricators and vacuum ejectors, and material that can be used on other engines of any type, such as copper piping, and buffers. All brass work is then stripped off, either for melting down or, in the case of engine nameplates, perhaps for sale as souvenirs to railway enthusiasts who are prepared to pay the full market value of the metal. The remainder of the engine, except the boiler, consists mainly of steel or cast iron, and these metals must be separated as far as possible by selective cutting operations with the oxy-acetylene torch. The boiler will be removed and, as it contains valuable copper, cut up independently. The engine frames, cab, tender and so on, will finally be cut into pieces small enough to be loaded by a crane into an ordinary open railway wagon, for despatch to the scrap merchant or steel foundry.

Lest it be thought that scrapping is a job for any "engine butcher" it should be pointed out that skill and experience are essential, and the men responsible for this work have been fully trained in locomotive manufacture and repair. They are able to identify the various metals correctly, for obviously the steel merchant does not pay for lumps of cast iron! They



Scrapping begins with the removal of the chimney and smoke-box of ex L.S.W.R. Drummond mixed-traffic 4-4-0 No. 30134.



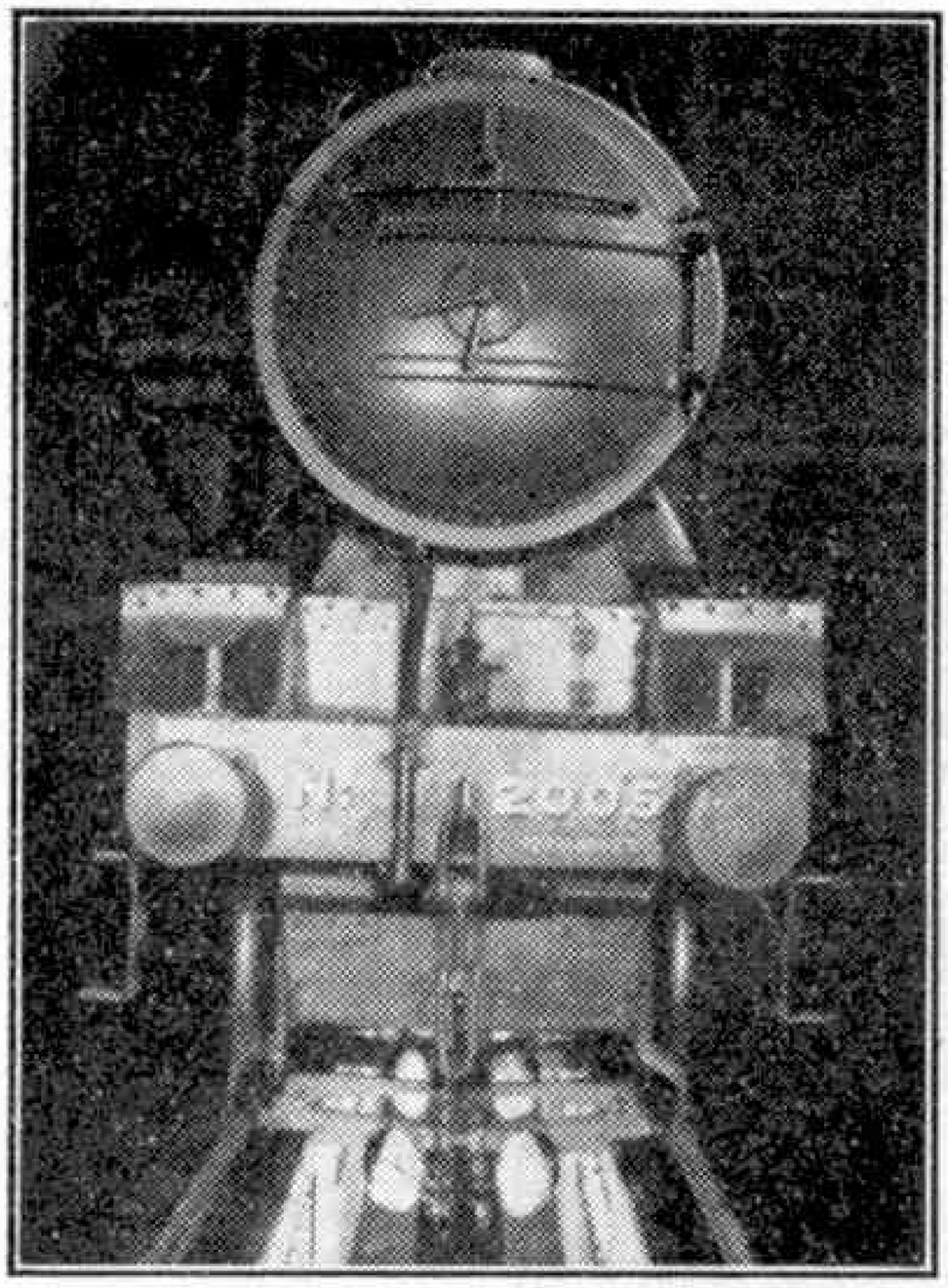
Using oxy-acetylene cutting apparatus to separate the chimney from the smoke-box wrapper. Note the typical Drummond safety valves on the dome.

know just where to make the cuts without waste of material, or of oxygen and acetylene gas, and without danger to themselves from sudden collapse of the severed portions. It is fascinating to watch an expert with the blow-torch, for he is able, when necessary, to burn out the rivets joining two parts together without damaging in any way the metal through which the rivets pass, in order to reclaim any particular part in good condition for further use.

The men engaged on this work can only be released from the repair shops at intervals, and it is therefore customary to allow a number of old engines to accumulate in some little-used siding until an attack can be made on them. These sidings are a mecca for the enthusiast, who takes his last chance of a photograph of some old favourite, such as the veteran Drummond 4–4–0 shown in our pictures.

Why Engines are Weighed

After an engine has been built or repaired, it is steamed for testing purposes and run on to an engine weigh-bridge, at the main workshops, which registers the individual weights on each wheel. The springs are then adjusted in order to make sure that each axle is bearing the correct proportion of the engine's weight, and that each wheel on an axle is loaded equally. The weights are adjusted correct to the nearest hundredweight. A higher degree of accuracy is not essential, as the weights on each wheel vary constantly when running. On the other hand, any considerable variation in weights may cause trouble with overloaded bearings, and will contribute to a tendency to derailment.



The weights on individual wheels of a locomotive are recorded by special apparatus in this illuminated weighing pit. British Railways Official Photograph.

A number of the largest running sheds also possess weigh-bridges, and if there is any reason to suspect that an engine in service requires weight adjustments, from complaints of rough riding or repeated trouble with a spring or bearing, it is sent to the nearest weigh-bridge for attention.

The illustration shows a novel form of weighing apparatus introduced at certain depots on the former L.N.E.R. some years ago. This equipment avoids the use of a permanent, built-in weigh-bridge. A separate scale is provided for each wheel, and the apparatus can be moved to suit the wheel arrangement of any type of engine.

From Our Readers

This page is reserved for articles from our readers. Contributions not exceeding 500 words in length are invited on any subject of which the writer has special knowledge or experience. These should be written neatly on one side of the paper only, and should be accompanied if possible by original photographs for use as illustrations. Articles published will be paid for. Statements in articles submitted are accepted as being sent in good faith, but the Editor takes no responsibility for their accuracy.

IRRIGATION IN TUNISIA

Water is the very life-blood of the Arab farmer in Tunisia. This North African country relies on a successful irrigation system for good crops. The system used is most primitive, but it works.

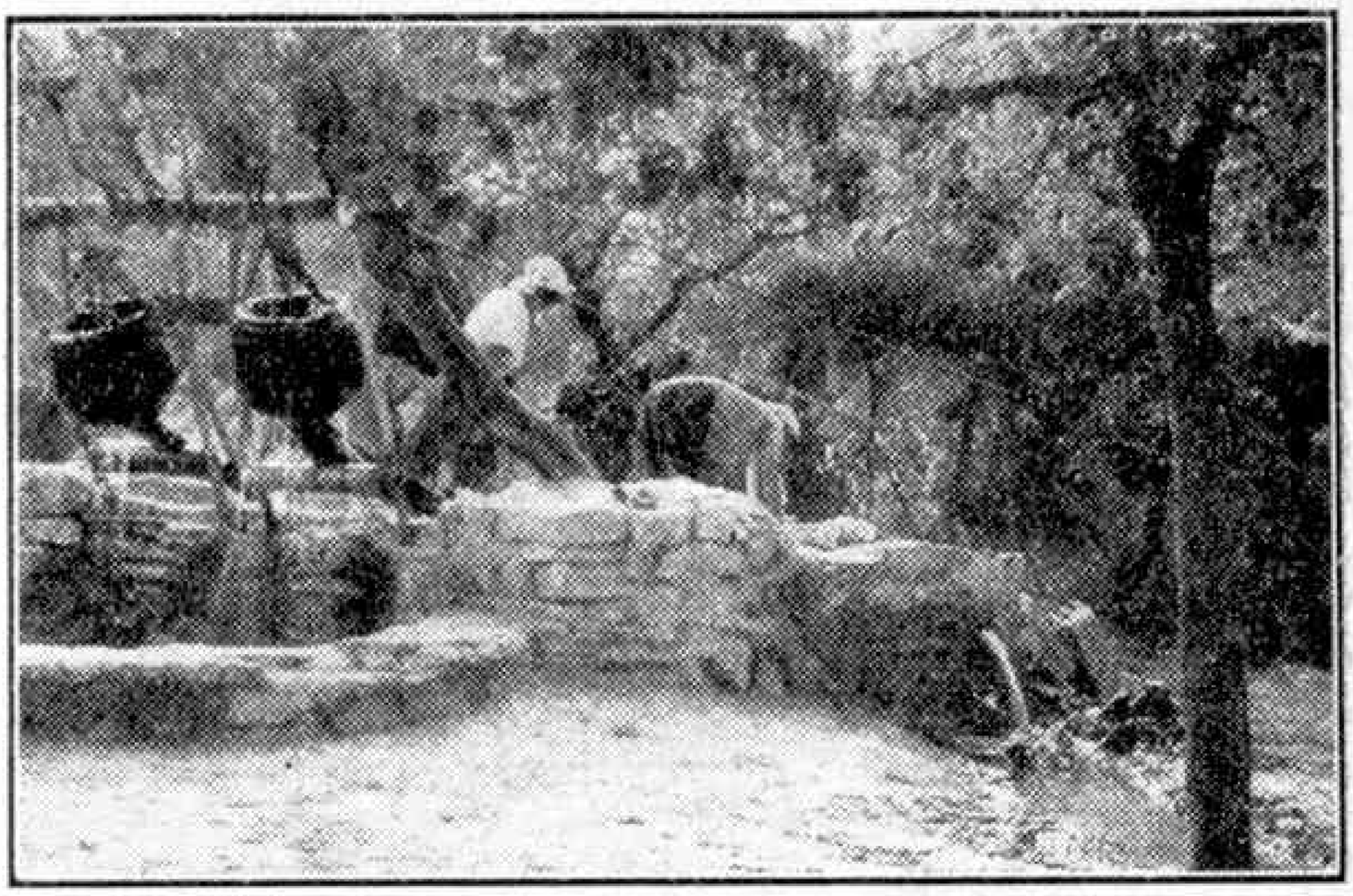
The upper illustration on this page shows how a field of maize at Grombalia, near Tunis, surrounded by olive trees, receives its water supply during the drought and heat of a North African summer.

The large leather "pails" when full of water are hauled by oxen. The water drains through a leather "sleeve" and then passes into carefully prepared channels in the field to be watered. The oxen are continuously travelling up and down an inclined platform, as the pails are first lowered and then raised. The channels are changed daily, so that different parts of the crop receive the beneficial water supply; this is simple because the channels are made in the soil.

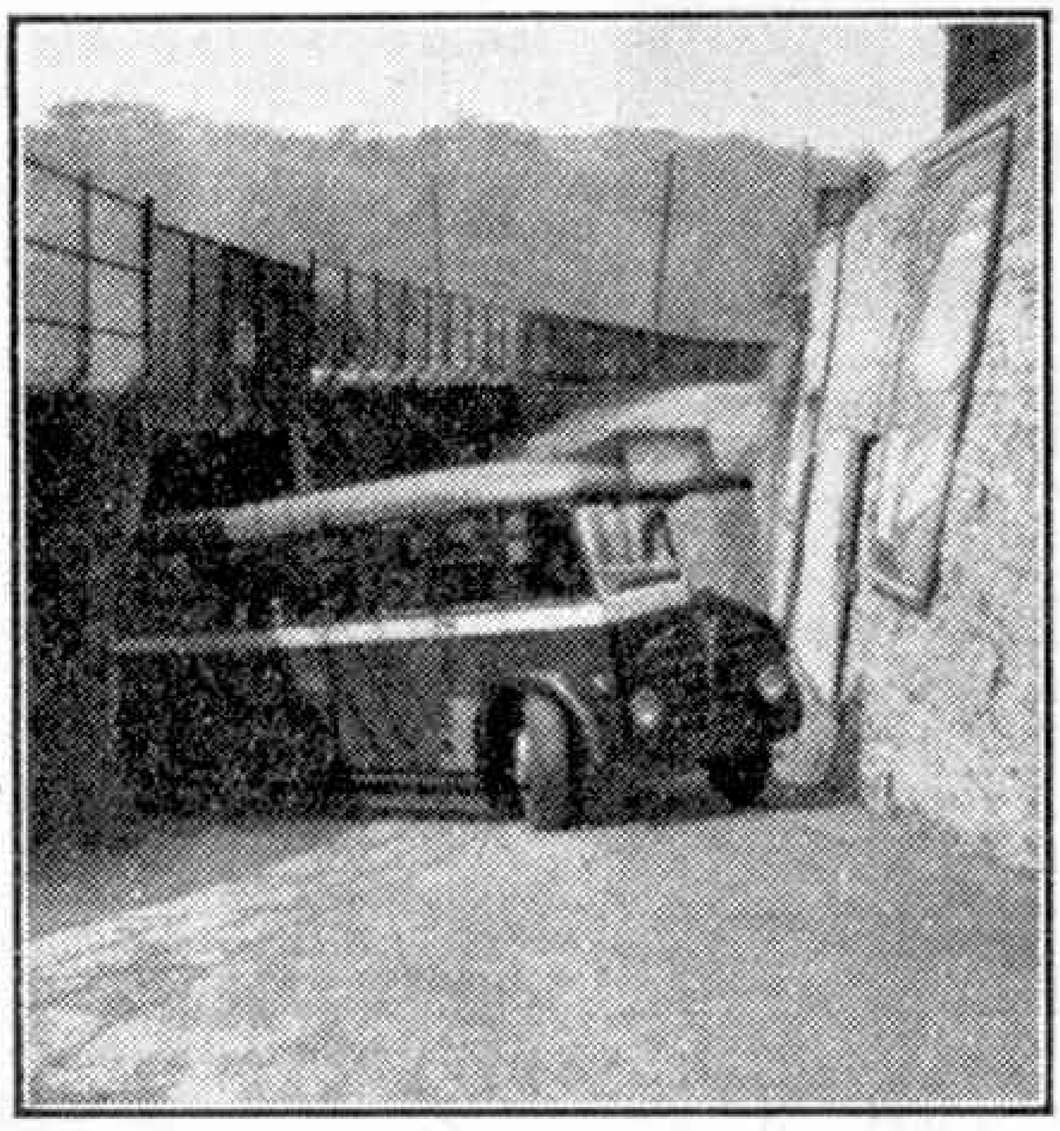
During the mid-day heat, the animals lie in the shade of the olive grove. It is then, usually, that the Arab housewife uses the platform and any troughs of water thereon for washing purposes, or laundry work.

The wooden framework and leather containers are 100 years old, but the system is much older than that and one wonders if the old order will ever change. The only permanent solution to the problem is the erection of a dam in the Tunisian Mountains.

E. Emrys Jones (Old Colwyn).



Primitive irrigation in Tunisia. Photograph by E. Emrys Jones, Old Colwyn.



A tight bend on a difficult Monmouthshire bus route. Photograph by G. Jenkins, Pengam.

A DIFFICULT BUS ROUTE

The West Monmouthshire Omnibus Board can rightly claim to have one of the most difficult routes in Great Britain. The section of this route that is of particular interest is that between Aberbargoed and Bargoed. There the bus encounters steep gradients, which include lengths of 250 ft. at 1 in 4½, 500 ft. at 1 in 5 and 1,220 ft. at 1 in 8.

In addition to these formidable gradients there are two right-angled bends. One of them, shown in the accompanying photograph, is under a low, narrow, railway bridge, and to avoid striking the piers of this the driver must lock the bus within about 12 in. of a precise spot. This is by far the most difficult part of the route and is worked by the board's eight senior drivers.

When the service was established in 1927, the buses used were Saurers, equipped with engine brakes, and when they required renewal, three Leyland Bull chassis were put in service. These were fitted with sprags to prevent them running away backward. One of these has now been replaced by a Foden chassis, fitted with two extra gears. The illustration, from a photograph that I took in May of this year, shows this bus passing under the railway bridge. Because of the non-standard requirements it was necessary to rebuild the old body.

G. Jenkins (Pengam).

A PROBLEM SOLVED

I noted with considerable interest the problem in "*Fireside Fun*" of the July 1951 issue of the "*M.M.*," concerning the smallest number that may be expressed in two different ways as the sum of the fourth powers of two numbers. I happened to know the answer, as during the previous term at school my form had been doing a certain amount of work on the Theory of Arithmetic, and think readers may be interested in it.

The solution of this fourth power problem is the large number 635,318,657. This is the sum of the fourth powers of 133 and 134, and also of those of 158 and 59.

M. W. S. Grigson (Chertsey).

October Model-Building Contest

Prizes for Meccano Models of all Kinds

THIS month we announce the first of the main Winter competitions in which good cash prizes are offered for the most original and best-built models sent to us. Every competitor has an equal chance in this Contest, no matter what size of Outfit he possesses, and the conditions of entry have been made as simple as possible.

All a competitor has to do is to think of a new model and then to set to work to construct it as neatly and realistically as possible from standard Meccano parts.

When the model is completed it is only necessary to obtain either a photograph or a good sketch of it and send this to us. *The actual model must not be sent.* The photograph or drawing need not be the competitor's own work, but it is absolutely essential that the model itself should be the result of his or her own unaided efforts. Entry forms are not required and there are no fees to be paid. The competition is open to readers of all ages living in any part of the world.

The judges will award the prizes for those models that are the most original in subject and are neatly designed and proportioned, and built on correct mechanical principles.

The Contest will be divided into the following two Sections: A, for competitors of all ages living in the British Isles; B, for competitors of all ages living Overseas. A separate set of prizes as announced in the accompanying panel on this page will be awarded in each Section.

Models of any kind whatever may be submitted, so that competitors have a very wide choice of subject. Those that really "work," or that may be put to some practical use, will stand a better chance of winning prizes than models that are not built to work or which do not reproduce the movements of their prototypes. Any number of parts may be used in building models, but good solid construction will count more than mere size alone.

Before posting their entries competitors must take care to write their age, name and address clearly on the back of each photograph or drawing submitted. Entries from competitors living in the British Isles must be marked with a large letter "A," and Overseas entries with a letter "B."

Home competitors entering Section A must send their entries in time to reach this office on or before 30th November 1951. The closing date for Overseas competitors is 29th February 1952. Envelopes should be addressed "*October Model-Building Competition, Meccano Ltd., Binns Road, Liverpool 13.*"

"OCTOBER" MODEL-BUILDING CONTEST

THE PRIZES

The following prizes will be awarded in each of the Sections A and B:

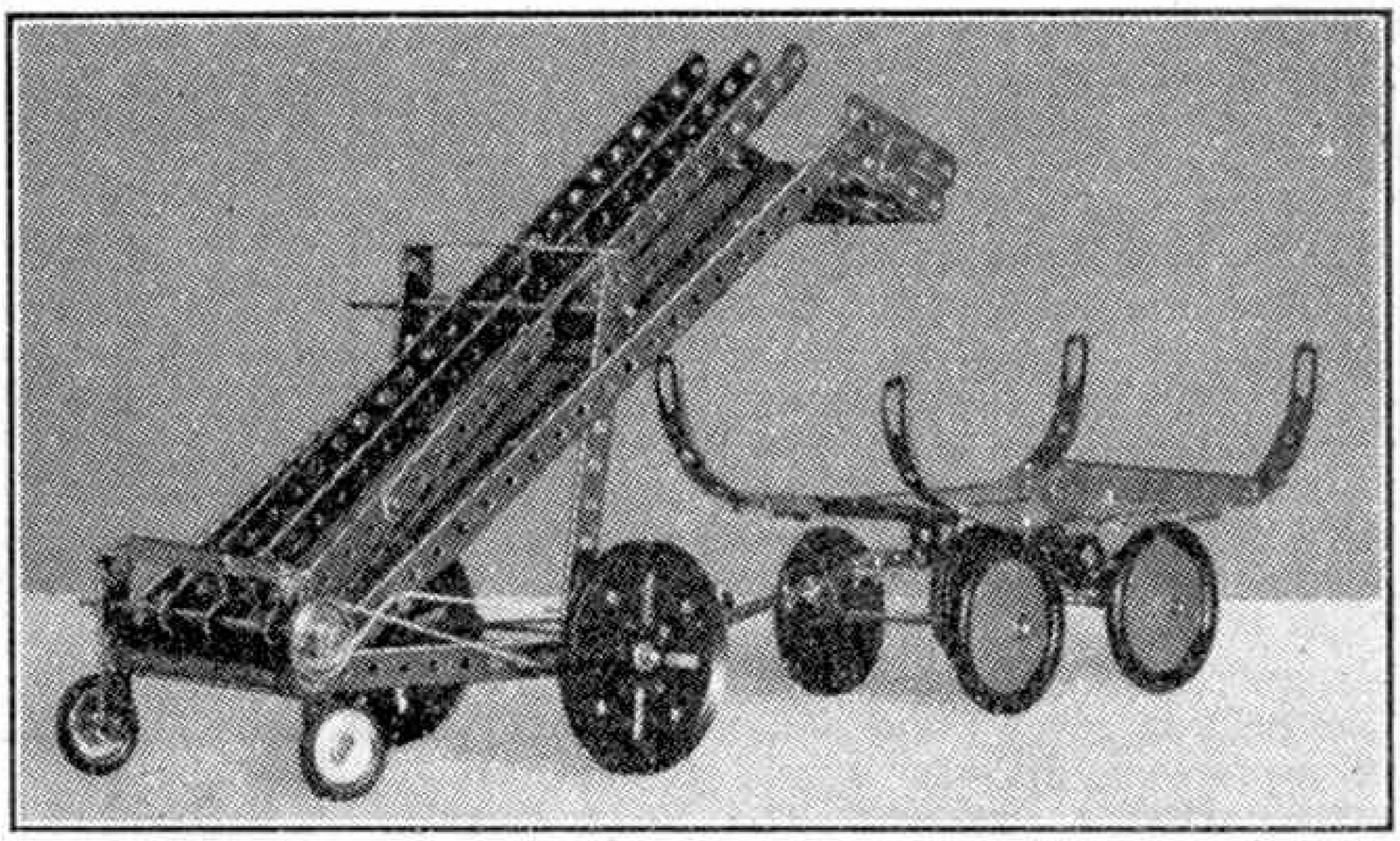
First	**Cheque for**	**£4**	**4**	**0**
Second	**Cheque for**	**£2**	**2**	**0**
Third	**Cheque for**	**£1**	**1**	**0**
Ten Prizes each of			**10**	**6**
Ten Prizes each of			**5**	**0**

Certificates of Merit also will be awarded.

MODEL-BUILDING COMPETITION RESULTS

Meccano "Short Story" Contest (Home Section)

First Prize, Cheque for £2/2/–: W. Whitaker, Dewsbury. Second Prize, Cheque for £1/1/–: J. Goodacre, Melton Mowbray, Leics. Third Prize, Postal Order for 10/6: T. D. Tasker, Barnsley.



An original model built from Outfit No. 4. It is a Hayloader and Wagon, and was constructed by W. T. Taylor, aged 10, Leigh, Stoke-on-Trent.

Five Prizes each of 5/–: T. Fryers, Hest Bank, Lancs.; C. E. Wrayford, Bovey Tracey; J. Douning, Dymchurch, Kent; P. Ponsford, Welling; C. H. Bryce, London S.E.9.

The entry that won the First Prize is as follows:

Girder, Pawl's sister, being a film *Fan*, put on her best at *Tyre* and began to *Drift* towards a Cinema. Suddenly she saw a *Dog-Clutch* an *Eccentric* man's arm and tear some *Strips* from his coat. She wished she was in a fairy tale so that she could *Rubber Ring* and tell the slave of the Ring to *Collar* the dog and *Pulley's* teeth away from the man's coat. At last the dog released his hold and made a *Bolt* for home. "*Washer* think of the way a *Crank-Handles* a dog," said the man. "He thought I was a *Worm* but I gave him a *Hook* to the jaw. He'll not want to *Face-Plates* for a while. Now I only want a new *Sleeve-Piece*" he added as he held up his torn sleeve.

"April Suggestions" Contest (Home Section)

First Prize, Cheque for £2/2/–: S. Jones, Edinburgh. Second Prize, Cheque for £1/1/–: R. Martin, Ewhurst, Surrey. Third Prize, Postal Order for 10/6; J. A. Lowrie, Stapleford, Nottingham.

Four Prizes each of 5/–: B. Robinson, Belfast; P. Knight, Downend, Bristol; M. Holmes, Barnet, Herts; B. L. Thomas, London W.4.

Among the Model-Builders

By "Spanner"

A Useful Lever Locking Frame

Fig. 1 shows a simple form of locking frame that will be found useful in models of all kinds where gear control and brake levers are incorporated. The purpose of the frame is to provide a means of locking or holding the levers in the required positions, and in practice it will be found very efficient. It was suggested by Mr. H. Taylor, Huddersfield, who designed it for use in a special weaving loom he built recently.

For the purpose of demonstration the frame is built up on a base formed of a $3\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate, and consists of two $3\frac{1}{2}''$ Strips 1 bolted at their lower ends to one of two $1\frac{1}{2}''$ Angle Girders fixed to the Plate. At their upper ends these Strips carry two 3" Strips 2 and 3, which are held on Pivot Bolts. These Bolts carry Compression Springs 4 and 5 and are lock-nutted as shown. The lever 6 is pivoted at its lower end on a $\frac{1}{2}''$ Bolt by means of an End Bearing 7, and passes between the 3" Strips. When the lever is moved to one side of the frame the Strips are forced apart at that end against the action of the Spring, while at the other end they are pressed together by the other Spring. The effect is to hold the lever sufficiently securely to prevent it from slipping out of place.

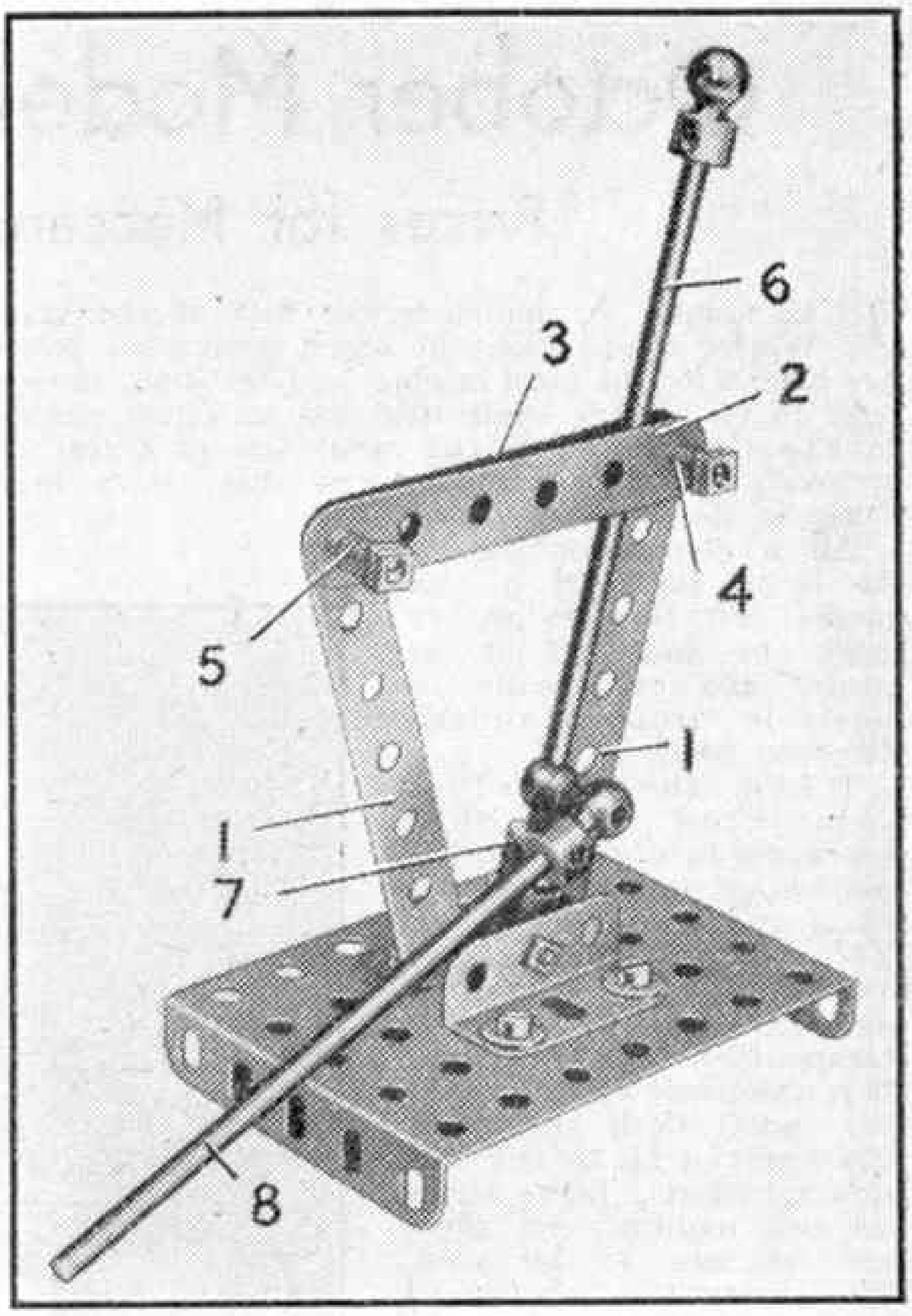


Fig. 1. A locking frame for a control lever. It is a suggestion of Mr. H. Taylor, Huddersfield.

The lower end of the lever can be connected in any convenient manner to the Rod or Strip actuating a brake or gear shaft. In our example it is so connected by means of a Rod 8 held in a Handrail Coupling pivoted by its threaded hole on the shank of a Handrail Support placed on the lever.

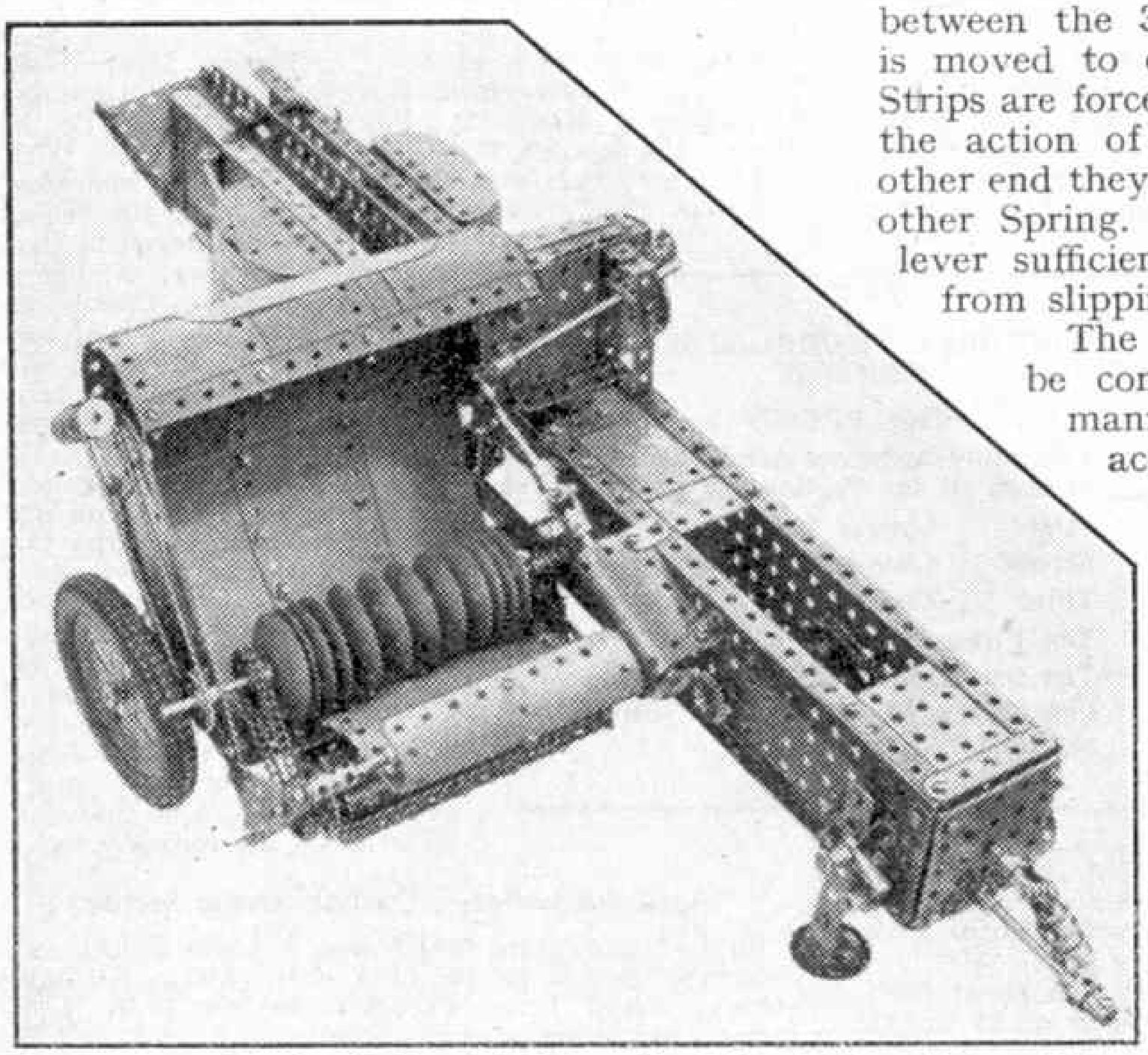


Fig. 2. A model of a McCormick International No. 45 type Pick-up Baler, built by 12-year-old Michael Fennemore, Alcester. Photograph by courtesy of The International Harvester Company of Great Britain Ltd.

A Fine Model Baler

On this page is an illustration of a model McCormick International No. 45 Pick-up Baler, which has been brought to my notice by The

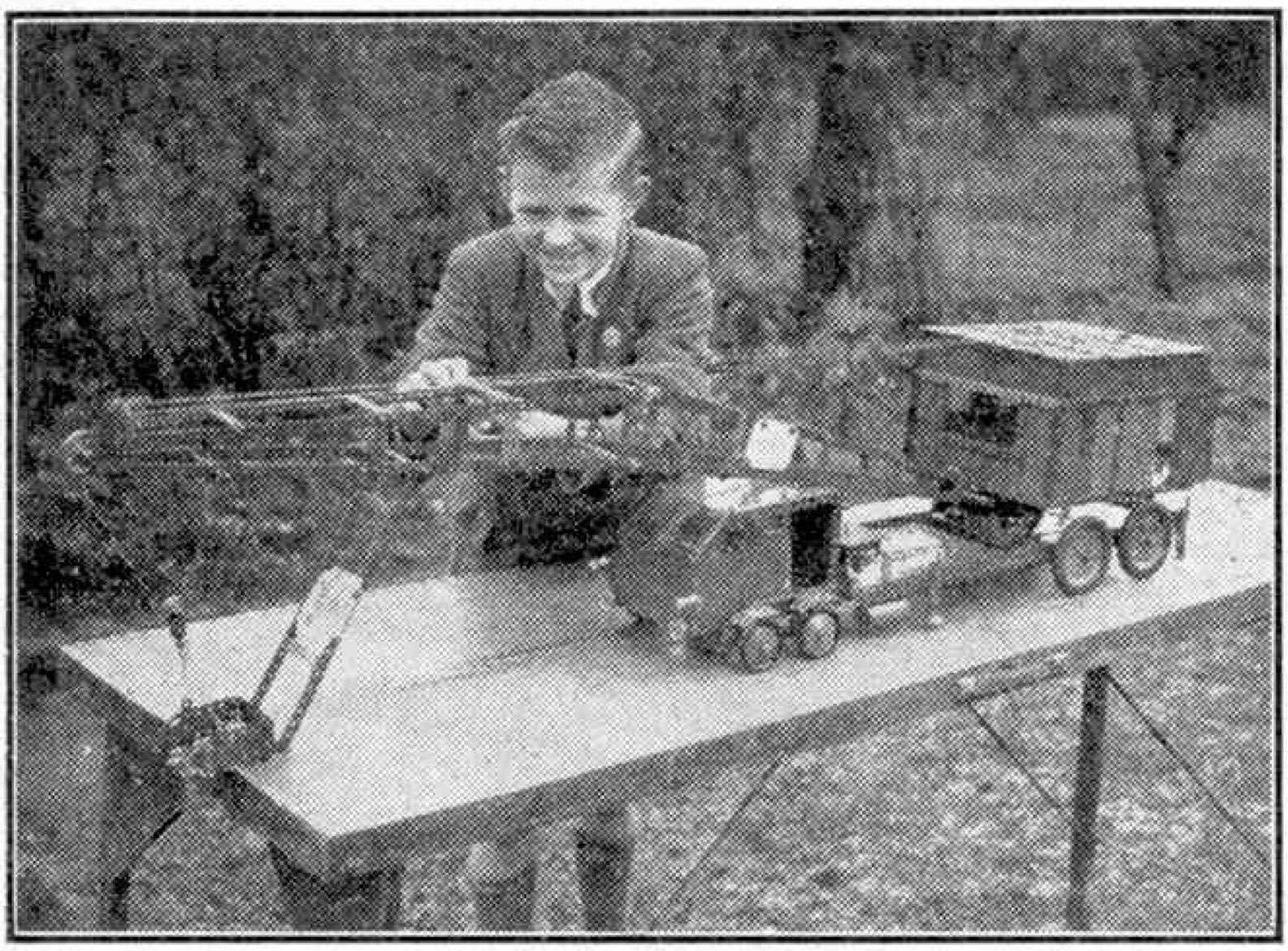


Fig. 3. A model crane based on a Smith mobile excavator of the type illustrated in the October, 1949, issue of the "M.M." It is the work of P. Body, Swansea.

International Harvester Company of Great Britain Ltd., London. The model was built from Meccano parts by 12-year-old Master Michael Fennemore, whose father operates one of the actual machines at a farm at Alcester, Warwickshire.

The Baler is designed for use in connection with a tractor, from which it derives its motive power. All the working parts of the model are driven from a power take-off shaft coupled to the tractor, and it is capable of carrying out all the essential operations with the exception of tying the packed bales.

A Convertible Mobile Crane

A Smith Mobile Excavator Crane provided Peter Body, Swansea, with a fine attractive subject for a Meccano model, with which he won First Prize in a Hobbies Competition at his Grammar School. Body is shown with the model in one of the accompanying illustrations (Fig. 3), and I think readers will agree with me that he has every reason to be proud of his handiwork. The machine is primarily intended for operation as a crane, but it will take all the usual digging equipment, and can therefore be used also as a digger, dragline or skimmer scoop. The model is also convertible to a pile driver, but the attachment used for this purpose is not shown in the illustration.

Front-Wheel Drive Mechanism

One of the entries in a recent model-building competition was the interesting front-wheel drive mechanism shown in Fig. 4. This mechanism was constructed by P. Lewis, Flamborough, who is 11 years old and has already shown great skill in designing and building Meccano models.

The front-wheel drive is combined with a differential unit made with Bevel Gears, and is mounted in a neat housing. The end of each half shaft from the differential is fitted with a Collar, to which a Socket Coupling is attached by Grub Screws. The free end of the Socket Coupling accommodates a Handrail Support, and the Grub Screw in this engages the slot in the Socket Coupling. This ensures that the Handrail Support turns with the Socket Coupling, but is free to pivot with the road wheel.

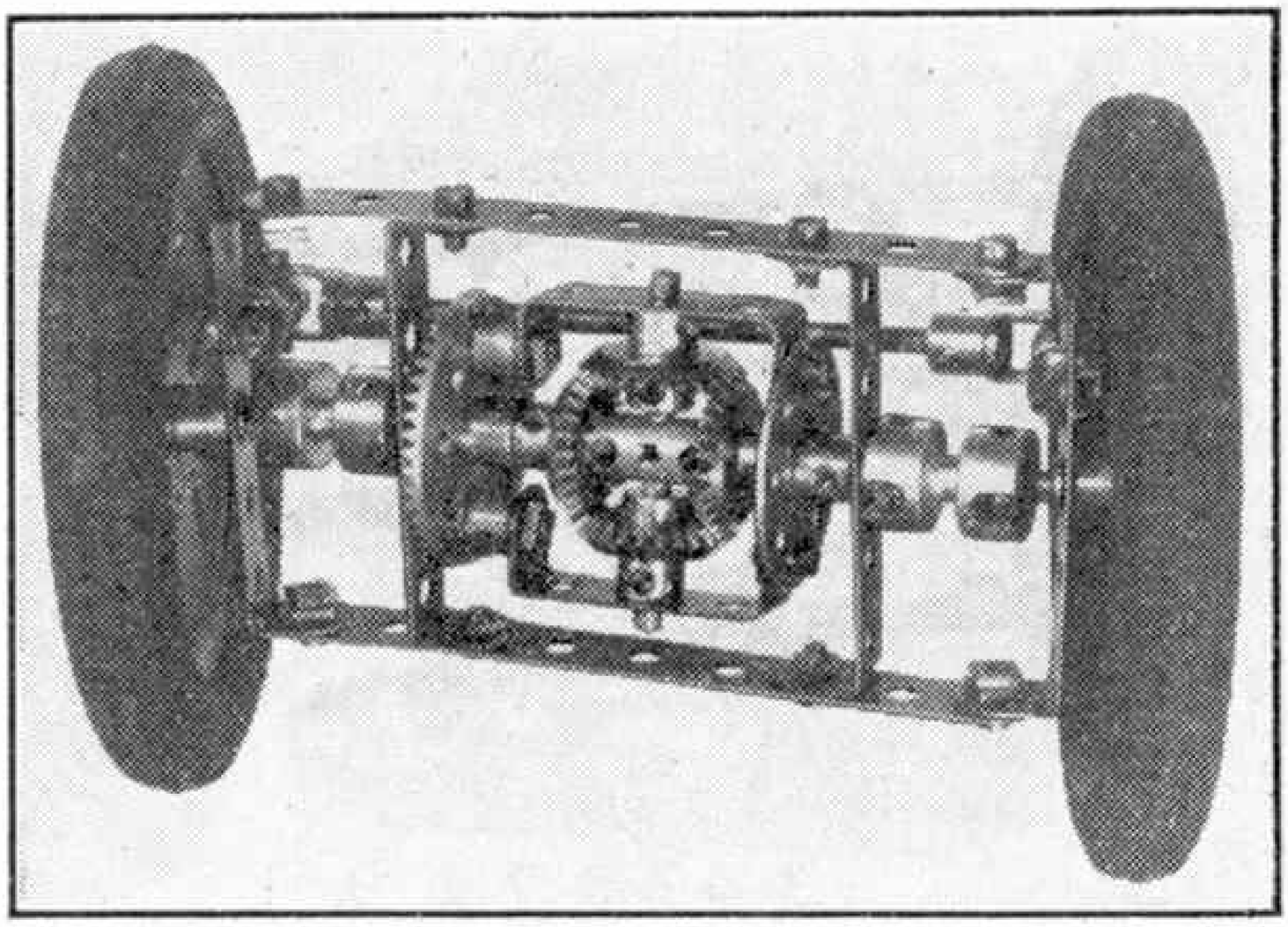


Fig. 4. P. R. Lewis, Flamborough, aged 11, sent this suggestion for a front wheel drive and differential mechanism.

New Meccano Model

Mechanical Shovel

OUR new model this month is a realistic mechanical shovel fitted with creeper tracks and powered by a Meccano E20R type Electric Motor. All the movements of the model are power driven, and steering is carried out by disengaging the drive to the appropriate track.

Construction should begin with the undercarriage, which is assembled by bolting a 5½" Flat Girder 1 (Fig. 2) to each flange of a 3½" × 2½" Flanged Plate 2. Other 5½" Flat Girders are then attached to 1½" × ½" Double Angle Strips bolted to the Flat Girders 1, and the driving Sprockets are fixed on 2" Rods mounted in the Flat Girders. The Sprockets are linked by Sprocket Chain, which represents the tracks, and a ¾" Sprocket on one of the 2" Rods on each side is also connected by Chain to a similar Sprocket on a 2" Rod 3. Each of the Rods 3 carries a ½" Pinion 4, and these can be meshed with ½" Pinions 5 fixed on a sliding Rod mounted in the Flat Girders 1. Pinions 5 are positioned so that when the Rod is in its central position each of them is in mesh with one of the Pinions 4, but by sliding the Rod one set of Pinions is disengaged.

Movement of the sliding Rod is controlled by a Pivot Bolt fixed in a Coupling 6. This Bolt engages between a Collar and one of the Pinions 5, and the Coupling is carried on a Rod mounted in a 2½" × ½" Double Angle Strip attached to Flanged Plate 2. A Motor Tyre fixed on a 1" Pulley maintains a light friction on the Rod, and a Crank forms the operating handle.

One of the Pinions 5 is in constant mesh with a ½" Pinion 7, fixed on a Rod that carries also a ¾" Pinion 8. Pinion 8 can be meshed with a ¾" Contrate 9, but by sliding the Rod the two gears are disengaged, the disengagement being controlled by a Pivot Bolt fixed in a Coupling 10. The Pivot Bolt engages between a Collar and the ¾" Pinion 8, and the Coupling is fixed on a Rod mounted in a 2½" × ½" Double Angle Strip bolted to the Flanged Plate 2. The control arrangements for this Rod are similar to those for the Rod carrying Coupling 6.

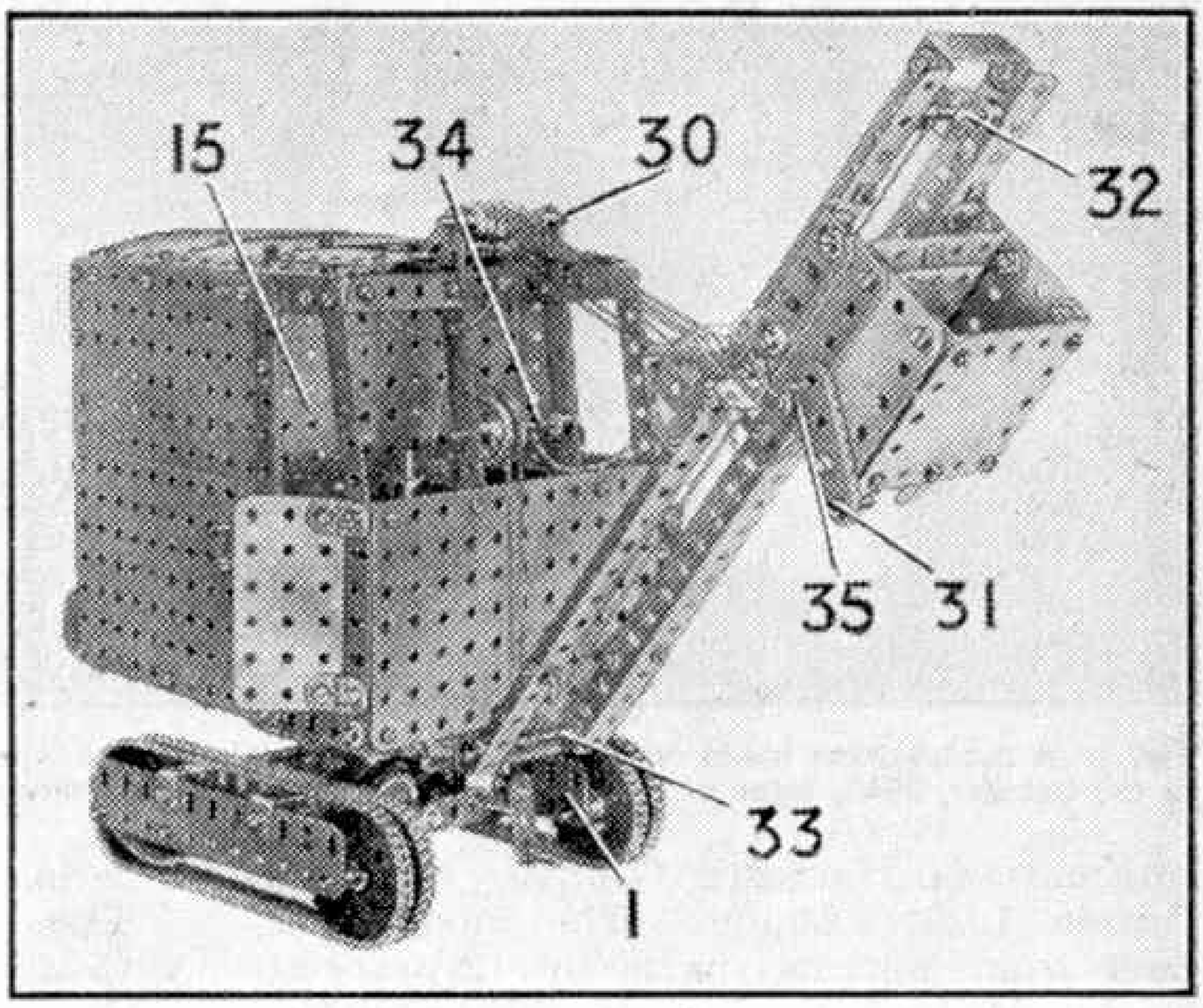


Fig. 1. This fine working model of a mechanical shovel has creeper tracks and is driven by an Electric Motor.

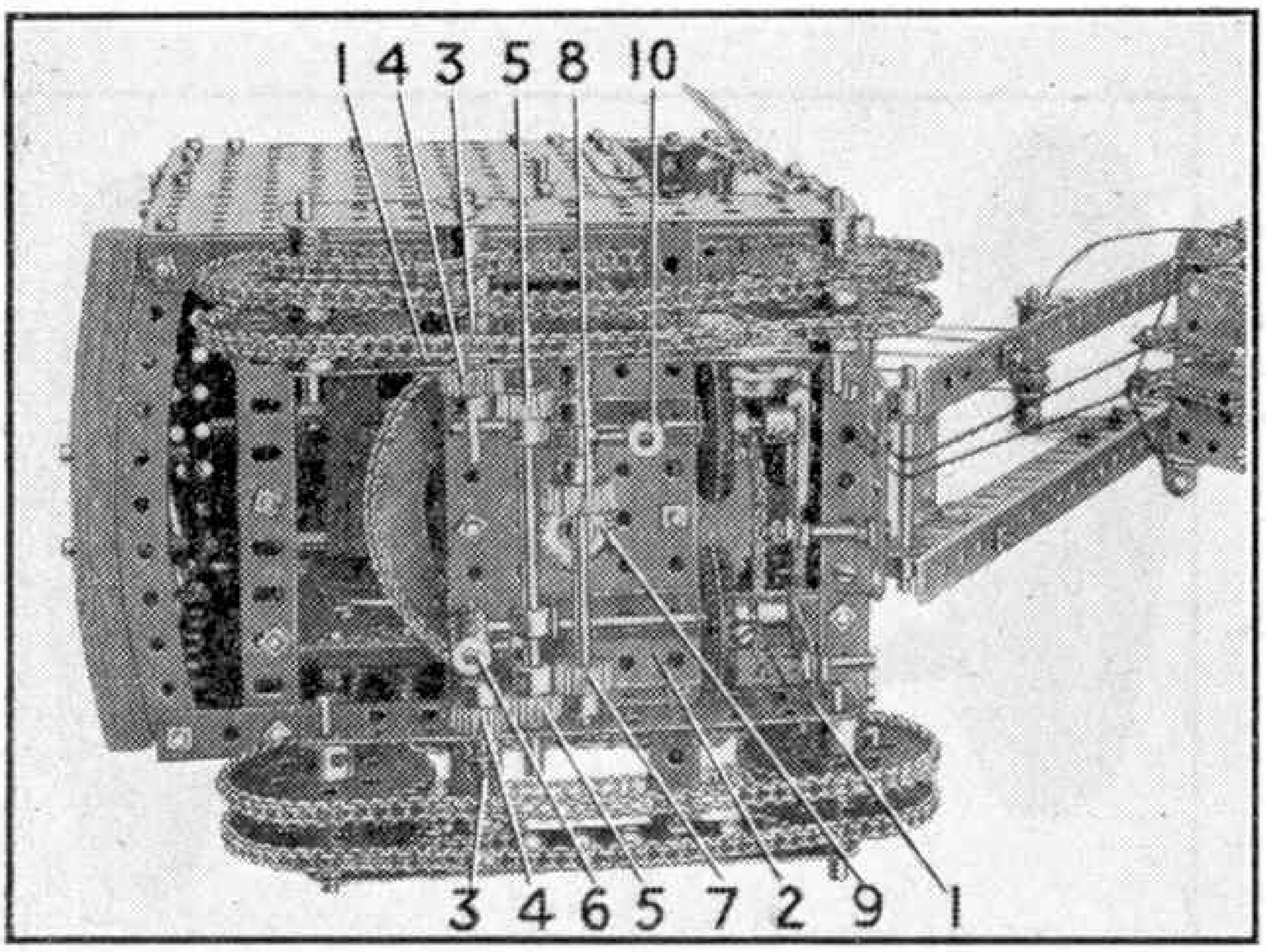


Fig. 2. The construction of the undercarriage of this Meccano mechanical shovel is made clear by this illustration of the actual model.

The Toothed Disc of a Ball Race is fixed to four Double Brackets bolted to the Flanged Plate 2. The Flanged Disc of the Ball Race is attached to the cab, and the Contrate 9 is fixed on a 5" Rod passed through the centre of the complete Ball Race. A Collar is used to hold the Rod in position.

The base of the superstructure is formed from two 7½" Angle Girders joined by 5½" Angle Girders 11, 12 and 13, and by a 5½" Curved Strip 14. The Flanged Disc of the Ball Race is attached to Angle Girders 12, and the E20R Electric Motor is bolted to one of these and also to Angle Girder 13. The sides of the cab are assembled from Flat Plates bolted to a framework of Strips and Angle Girders. A partition 15 consisting of a 5½" × 2½", a 4½" × 2½" and a 3" × 1½" Flat Plate, is attached to a 5½" × ½" Double Angle Strip bolted to the sides, and a similar Double

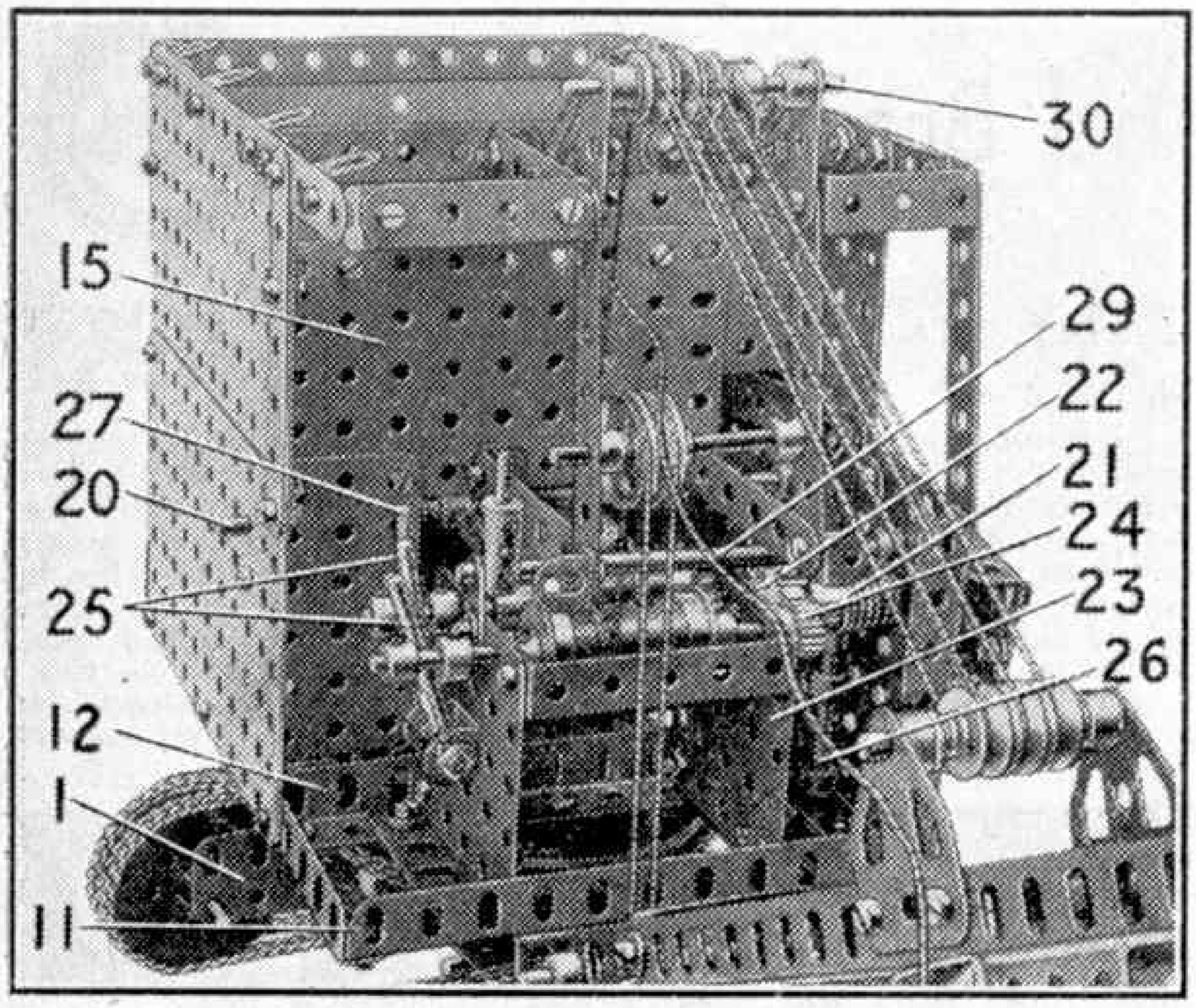


Fig. 3. The mechanism of the shovel is shown here, with the controls for swivelling, luffing and other movements.

Angle Strip 16 (Fig. 4) is also fixed between the sides. The 5" Rod carrying the Contrate 9 is supported at its upper end in Double Angle Strip 16, and is fitted with a 1½" Bevel 17.

A ½" Pinion on the Motor shaft meshes with a 57-tooth Gear fixed on a 2½" Rod mounted in the Motor side-plates. A ½" Pinion also on this Rod engages a 57-tooth Gear on a 3½" Rod 18, on which there is also a Worm that is in constant mesh with a ½" Pinion 19. The Rod 20 of this Pinion is mounted in the sides of the cab, and is fitted with a ½" Bevel that is in constant mesh with Bevel 17, and outside the cab it carries also a ¾" Sprocket. This Sprocket is linked by Chain to a similar Sprocket fixed on a 2" Rod that is fitted with a Worm 21 and a ½" Pinion 22. Bearings for the Rod are provided by one side of the cab and by a 2½" × 2½" Flat Plate 23 fixed to a 2½" Angle Girder that is bolted between Girders 11 and 12. The Flat Plate 23 is connected by 2½" × ½" Double Angle Strips to a similar Plate supported in a like manner. A casing for the external Sprocket drive is provided by two 4½" Angle Girders joined by a 4½" Flat Girder, and attached to the side by Angle Brackets.

Luffing of the boom and the travel of the bucket are controlled from two similar winding drums, each of which consists of a Sleeve Piece fitted with two ¾" Flanged Wheels. The drums are fixed on 4" Rods mounted in the 2½" × 2½" Flat Plates, each Rod carrying two Collars and a ½" Pinion 24. The drive to each drum is engaged by sliding the Rod to bring Pinion 24 into mesh with Pinion 22. Movement of the Rod is controlled by a lever 25, which is a 1½" Rod fixed in a Rod and Strip Connector lock-nutted to a Double Bracket. The Double Bracket is bolted to one of the 2½" × 2½" Flat Plates, and the 1½" Rod engages between Collars on the winding drum shaft.

The swivelling movement is engaged by sliding a ½" Pinion into mesh with Worm 21. This Pinion is mounted on a 4½" Rod 26, which passes at its lower end through one of the 7½" Girders of the cab base and at its upper end through a 1" × ½" Angle Bracket bolted to the side. The Pinion is engaged by moving a lever 27, which consists of a 1" Rod held in a Coupling. The Coupling is fixed on a transverse 4½" Rod fitted with a Coupling 28 (Fig. 4), and mounted in the 2½" × 2½" Flat Plates. A ⅜" Bolt in Coupling 28 locates between the boss of the Pinion and a Collar on Rod 26. A 1" Sprocket on the same Rod, but below the superstructure, is connected by Chain to the Toothed Disc of the Ball Race.

An arm of the Motor switch is lengthened by a 1½" Strip, which is linked by a 4½" Strip to a Crank on Rod 29 (Fig. 3). The Bolts holding the Strip are lock-nutted, and Rod 29 is mounted in one side of the cab and in a Fishplate fixed to one of the 2½" × 2½" Flat Plates. The control lever is a 1" Rod held in a Coupling.

The boom is made by connecting two 12½" Angle Girders by two 1½" × ½" Double Angle Strips, and it pivots on a Rod passed through a 1½" × ½" Double Angle Strip bolted to a 2½" Flat Girder attached to Angle Girder 11. A Flat Trunnion is fixed to each 12½" Angle Girder, and a Rod mounted in them carries three ½" loose Pulleys. Three similar Pulleys are slipped over a Rod 30 mounted in 1½" Corner Brackets fixed to the cab. The luffing Cord is tied to its drum, passed round the sets of ½" Pulleys and is tied to a Fishplate on Rod 30.

The sides of the bucket are 2½" × 1½" Flexible Plates joined by 2½" × ½" Double Angle Strips. The top is a 2½" × 2½" Flat Plate and the bottom is a 2½" × 2½" Flexible Plate. The trap is a 2½" × 1½" Flexible Plate to the lower edge of which two 2" Strips are attached by Angle Brackets. To each Strip a similar part is bolted at right angles, these Strips being lock-nutted at their forward ends to a Double Bracket fixed to the top of the bucket. A catch for the trap is provided by three 2" Strips pivoted on a (Cont. on page 478)

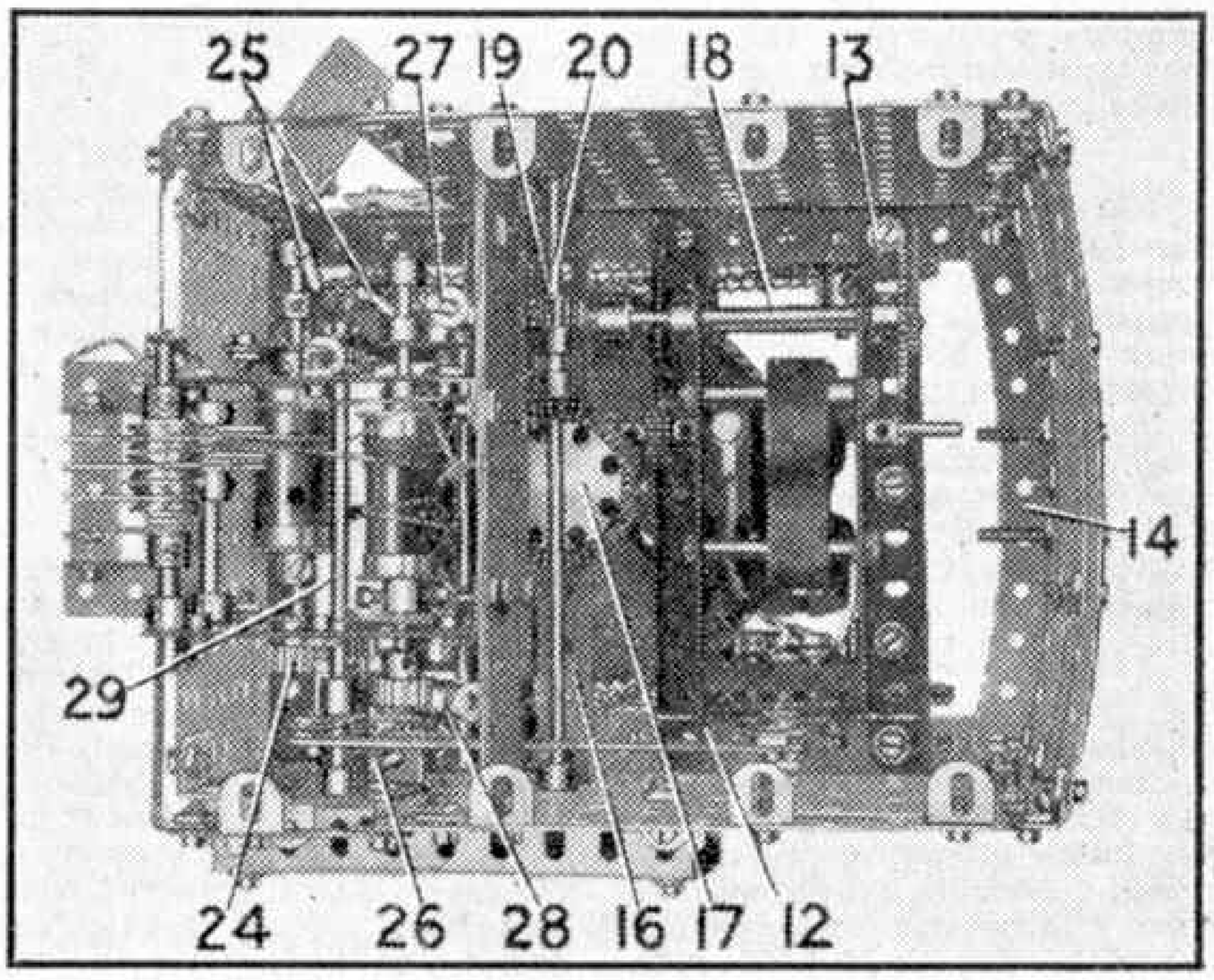


Fig. 4. View looking down into the model before the roof of the cab is fitted, showing the driving mechanism and the Electric Motor.

Club and Branch News

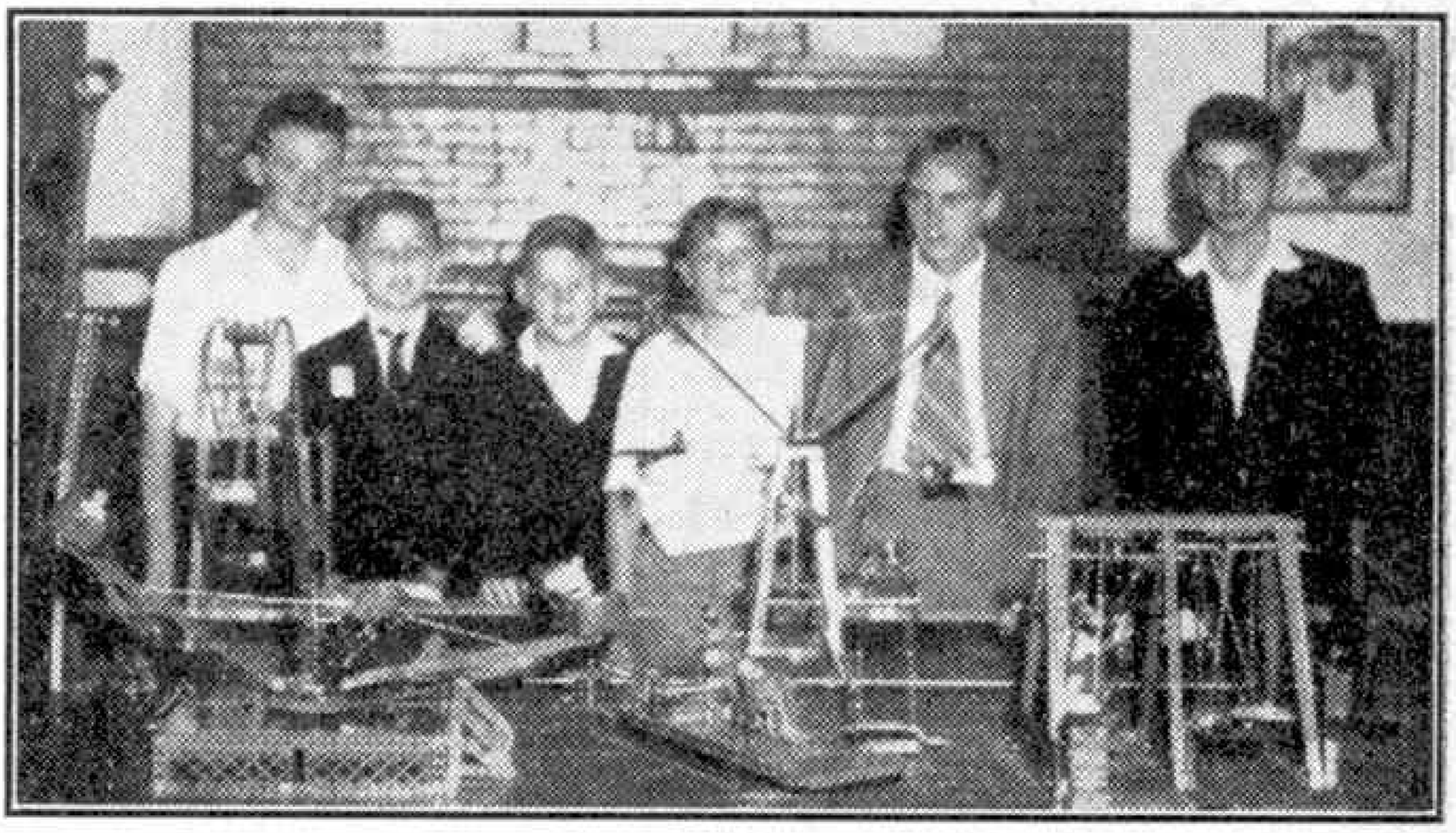
WITH THE SECRETARY

FORM YOUR OWN CLUB!

Every day I receive letters from Guild members asking where their nearest Clubs hold meetings. The desire to become a member of a Club is very praiseworthy and I hope that every Meccano enthusiast will look round for an organisation that he can join. If there is no Club within easy reach then plainly he must set about forming one himself.

Starting a new Club is not a very difficult matter. All that is necessary to begin with is to gather together a few enthusiasts who have similar ideas and to make arrangements for joint model-building. In the early stages, when members number only three or four, meetings can quite well be held at the homes of members; it is only when the number of these becomes larger, and there is a risk of stretching a welcome too far, that a separate Club Room becomes necessary. In fact, there are many small unaffiliated Clubs in which the members are just a few friends who meet together in the way I have described to make their model-building more enjoyable, and it is certainly worth while forming a Club even if it does not get beyond this stage.

I and my staff are interested in all Clubs large and small; all we look for is some opportunity of helping members to increase the fun of model-building in this or in any other way. So form your own Club now.



A model display arranged by the Malvern (Johannesburg) M.C. for a Y.M.C.A. Fete, where the "Meccanoland Fair" attracted great attention. Mr. Lorimer, Leader of this well-known South African Club, is second from the right in the group behind the display, and from left to right other members seen are H. Martin, C. Pierce, G. Glass, D. Nelson and R. Crapper.

AN AEROMODELLING HOLIDAY

Most Meccano Clubs include model aircraft constructors among their members, and these no doubt will be interested in an opportunity for a camping holiday in the course of which they can enjoy their hobby on a good flying field. An opportunity of this kind is afforded by the development of the Eaton Bray Sportsdrome, at Stanbridge, near Leighton Buzzard. There good accommodation is now available at reasonable charges and I shall be glad to send copies of leaflets explaining the arrangements to Leaders of Clubs, or to individual members who are attracted by the scheme.

CLUB NOTES

GREAVES METHODIST CHURCH M.C.—The late summer programme included Treasure Hunts, Tracking and Exercise Evenings, Swimming and Rambles, the latter giving more enjoyment than had been thought possible. Club roll: 16. *Secretary:* Mr. T. Starr, "Derwent," Scotforth Road, Lancaster.

FOREST SCHOOL (SNARESBROOK) M.C.—The basis of membership has been enlarged by enrolling day boys, a move that has been very successful. More Model-building Competitions have been held. A special display of models of prize-winning standard was made on the School's Exhibition Day. Club roll: 11. *Secretary:* D. C. Dunn, 64, London Road, Clacton-on-Sea, Essex.

MILE END (PORTSMOUTH) M.C.—Intense model-building activity prevailed in preparation for a further Exhibition. Musical Evenings also have been enjoyed. At the Exhibition special features were a fine display of model aircraft, photographs taken by members and an art gallery of paintings and drawings, also the work of Club members. A Hornby-Dublo layout, with specially made scenic attractions, was a further attraction. Club roll: 39. *Secretary:* Mr. Nicholson, 213, Sultan Road, Buckland, Portsmouth.

AUSTRALIA

MELBOURNE M.C.—Interest in Model-building is increasing. Models built by members and demonstrated at meetings have included motor lorries, a fine motor chassis, and a battleship that was blown up by a "torpedo" from a Meccano submarine. A ship coaler has been constructed and was used to fill the trucks of coal trains on the Club's miniature railway. Club roll: 10. *Leader:* Mr. L. Ison, 8, Hayes Street, Northcote, N.16, Victoria.

BRANCH NEWS

REDDIFORD SCHOOL—Excellent progress has been made with the model village, which represents part of Pinner. A model of a motor boat is being constructed. A Quiz organised by one of the members was very successful. *Secretary:* R. V. Galley, 35, Field End Road, Eastcote, Pinner, Middlesex.

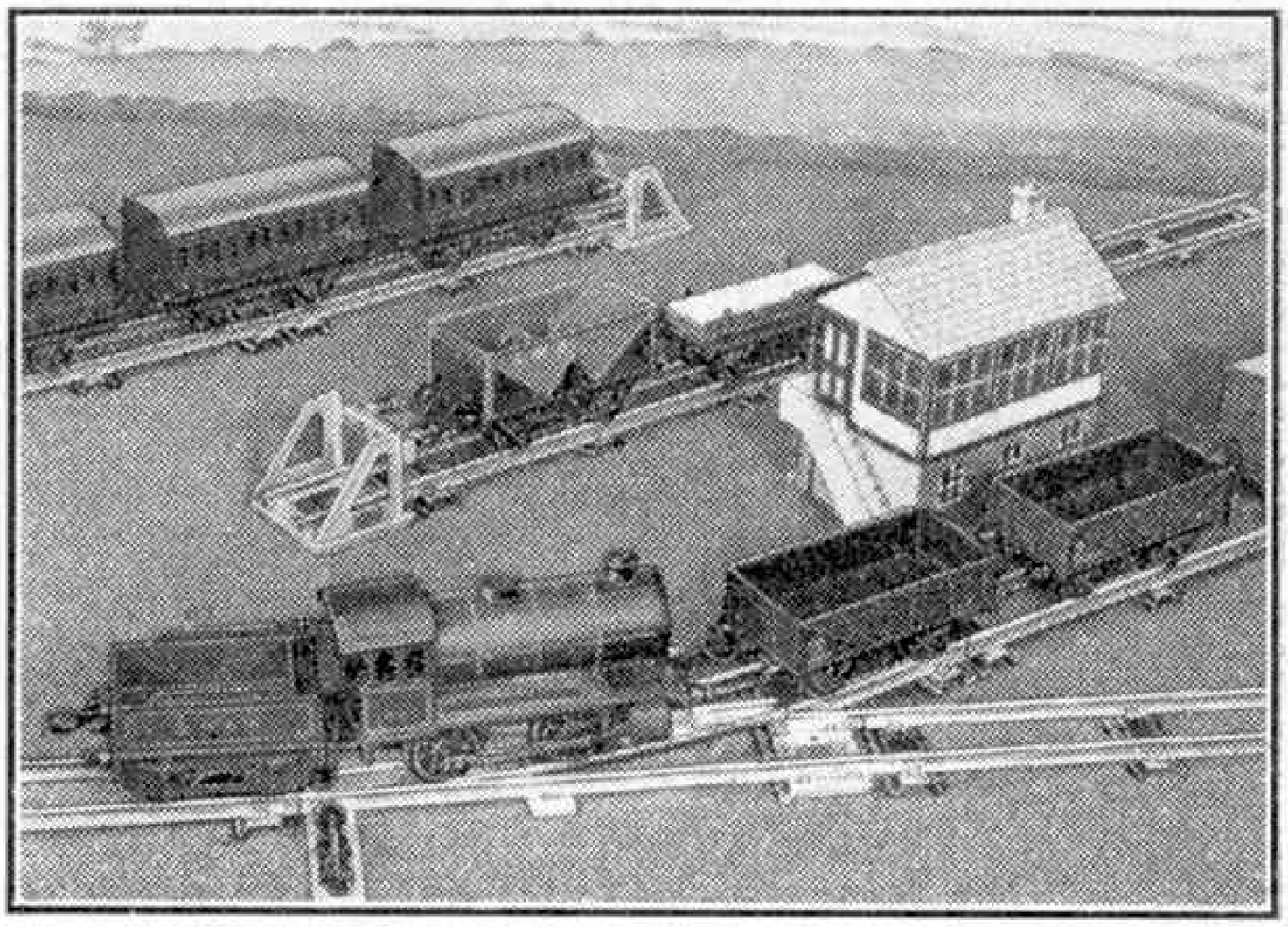
MAGDALEN COLLEGE SCHOOL (OXFORD)—Special care is taken to keep the Branch track clean and properly aligned. All the bridges have been strengthened and further constructional work undertaken, particularly in preparations for the Branch display at the Commemoration Ceremonies of the School. The result was very successful. *Secretary:* R. S. Stanier, Magdalen College School, Oxford.

Improvements to a Hornby Layout

A MINIATURE railway consisting simply of a plain track with no lineside features lacks the realistic effect that the addition of even a few accessories can give. The supply situation is difficult just now, but many Hornby Train owners have equipment from pre-war layouts handed down to them by fathers or elder brothers, while others may have been fortunate enough to have obtained some new equipment.

A station forms the necessary base of operations, and a Hornby Station is usually one of the first lineside items to be added. To provide some activity apart from the trains that call there, good use can be made of Meccano Dinky Toys Motor vehicles. These can stand outside the Station awaiting the arrival of trains. We can have private cars to carry passengers, or goods-type vehicles to pick up milk, mails and any miscellaneous baggage.

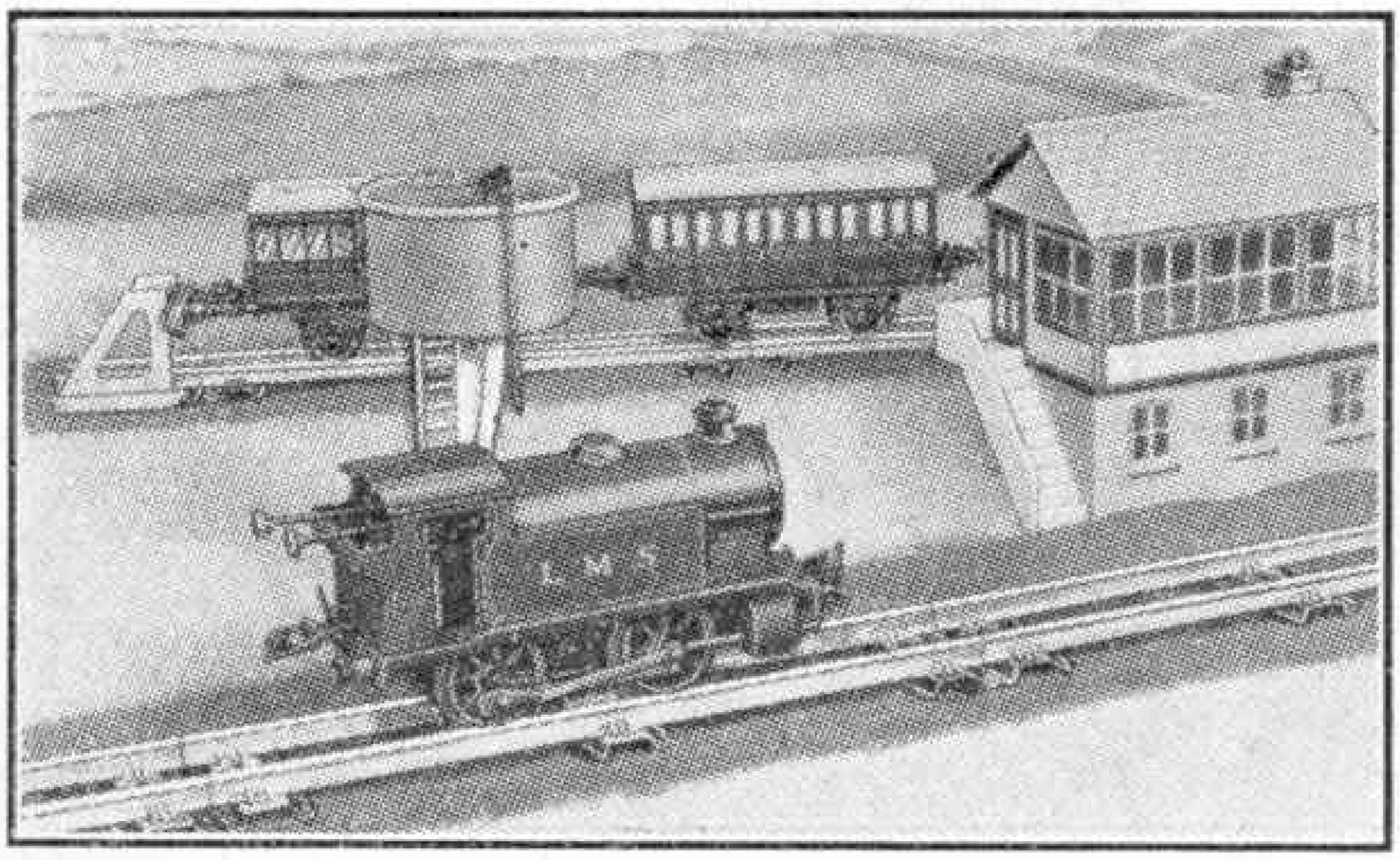
Roads approaching stations sometimes cross the track at level crossings instead of passing over or under it by means of a bridge. If the miniature railway operator is lucky enough to possess a Hornby Level Crossing it will add greatly to the fun, as vehicles can reach the station from several directions, and in addition be able to cross over the track. It is good fun to close the gates to road traffic ready for the train and then to change them again after the train has departed, thus leaving the road clear for motor vehicles. One of the younger members of the "staff" will enjoy acting as crossing-keeper.



Shunting operations in progress near a Hornby Signal Cabin. Note the effective appearance of the Buffer Stops in the sidings.

Many level crossings situated at stations have signal boxes near by, and the control of the gates then comes under the signalman's duties as a rule. A Hornby Signal Cabin looks well when placed near a Level Crossing on a layout. At junctions where branch lines leave the main track a cabin is necessary, while it can also be placed with advantage close to sidings or running loops where the "boxman" can keep an eye on traffic moving in and out.

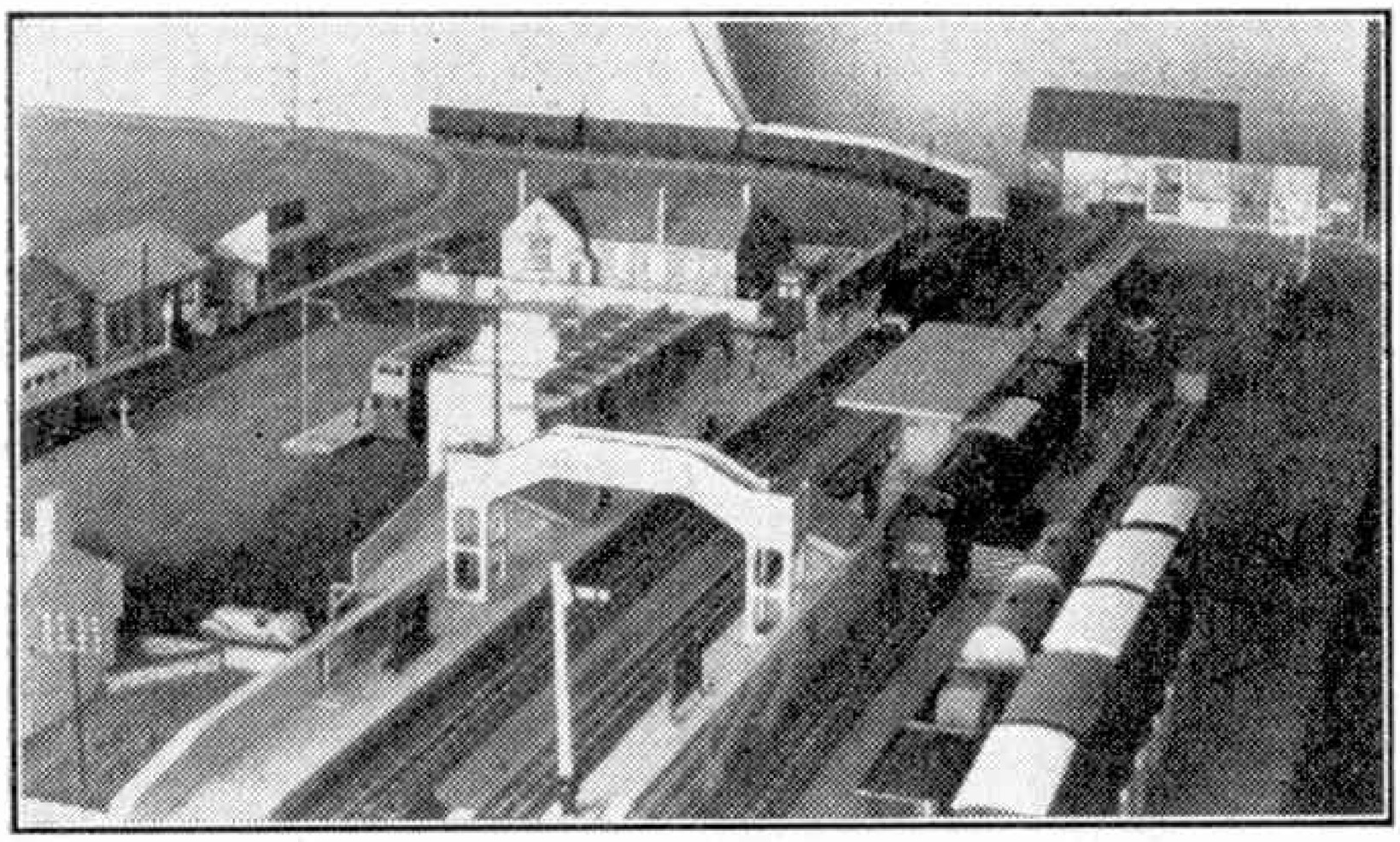
If sidings are included in a layout they should be completed by Hornby No. 1 Buffer Stops, as shown in the illustrations on this page. The inclusion of sidings and Buffer Stops gives a layout a much more business-like appearance.



A Hornby Tank Locomotive "filling up" at the Water Tank. When ready the engine will take away the No. 1 Coaches waiting in the siding beyond.

An L.N.E.R. Layout in Hornby-Dublo

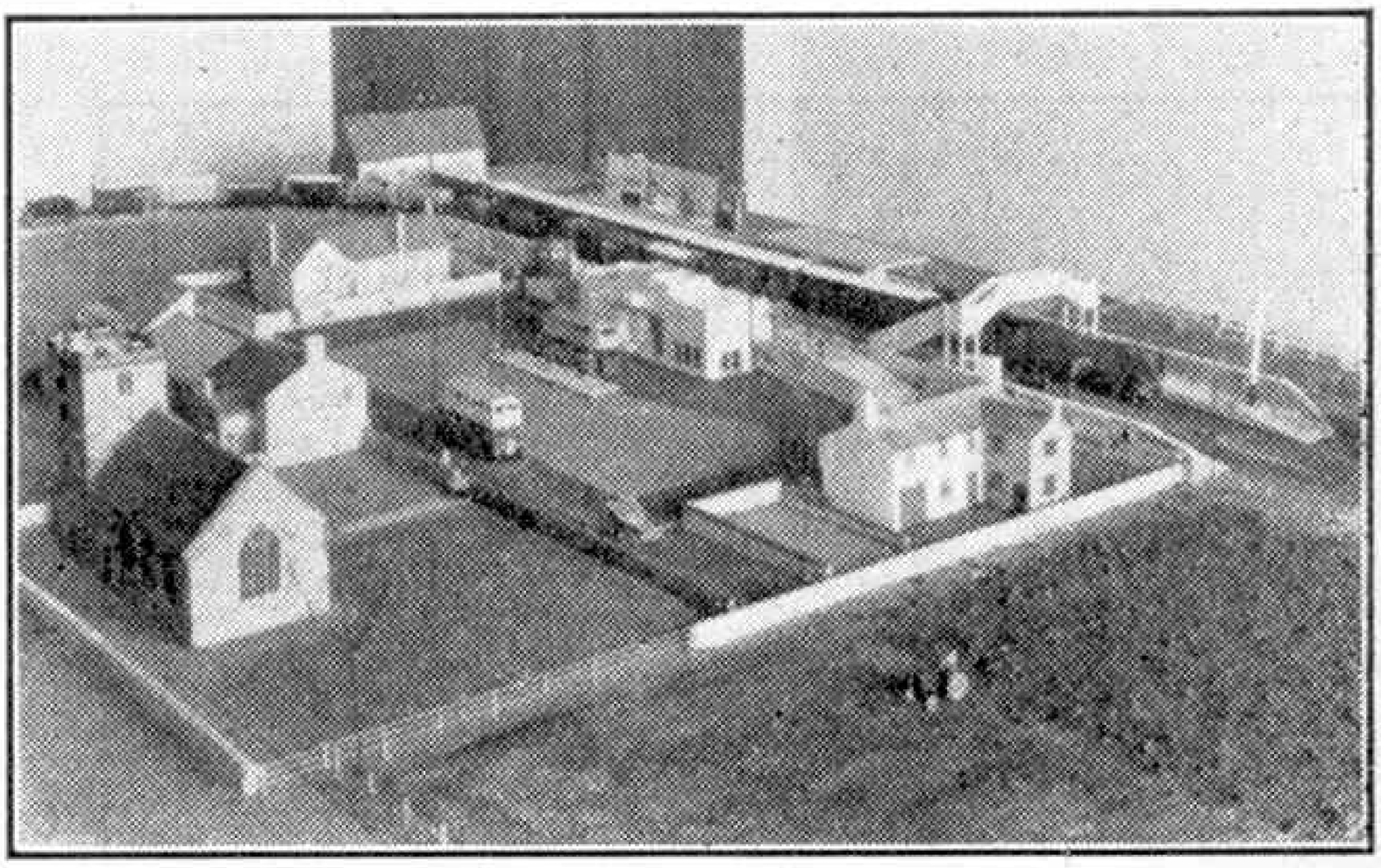
THE pictures on this page show parts of an attractive Hornby-Dublo layout that is operated by Mr. A. C. Harmer, of Eastbourne, and his son, both of them very keen Hornby-Dublo railway engineers. The layout is arranged on a table consisting of two pieces of composition board mounted on a collapsible frame. Owing to space restrictions the layout has to be accommodated over the bed in a spare room, but this location allows the operators to get all round the track if necessary.



A view of part of the layout described on this page. An express headed by Hornby-Dublo "Sir Nigel Gresley" is approaching the station.

The chief traffic centre on the line is a two-road passing station, in the formation of which standard Hornby-Dublo and home-made components have been effectively combined. The main platforms are of wood, and on one side the Hornby-Dublo Through Station has been set in at the back of the wooden platform as shown in the upper picture. A standard Footbridge connects this side of the station with the other platform on which a building with awning is erected. On the inner side of the track the Hornby-Dublo Station forms practically one side of the "village square," where there is a bus terminus well served by Dinky Toys double-deckers. Various houses and other buildings face the square, these being made up from the printed cut-out cards of Hambling's "Bilteezi" series, available at many model shops. Fields and other surfaces are gummed, sanded and painted in appropriate colours, ploughed fields being first covered with corrugated paper. A tunnel and the approach cuttings are moulded in papier-maché.

Engines and passenger rolling stock all represent L.N.E.R. prototypes, while the goods vehicles, thirteen in number, are more varied. A *"Sir Nigel Gresley"* handles the main line traffic which is heavy, and passenger trains frequently convey the odd van or two of urgent traffic.



The realistic disposition of the miniature buildings on the layout helps the general effect considerably. Crowding of the various accessories has been carefully avoided.

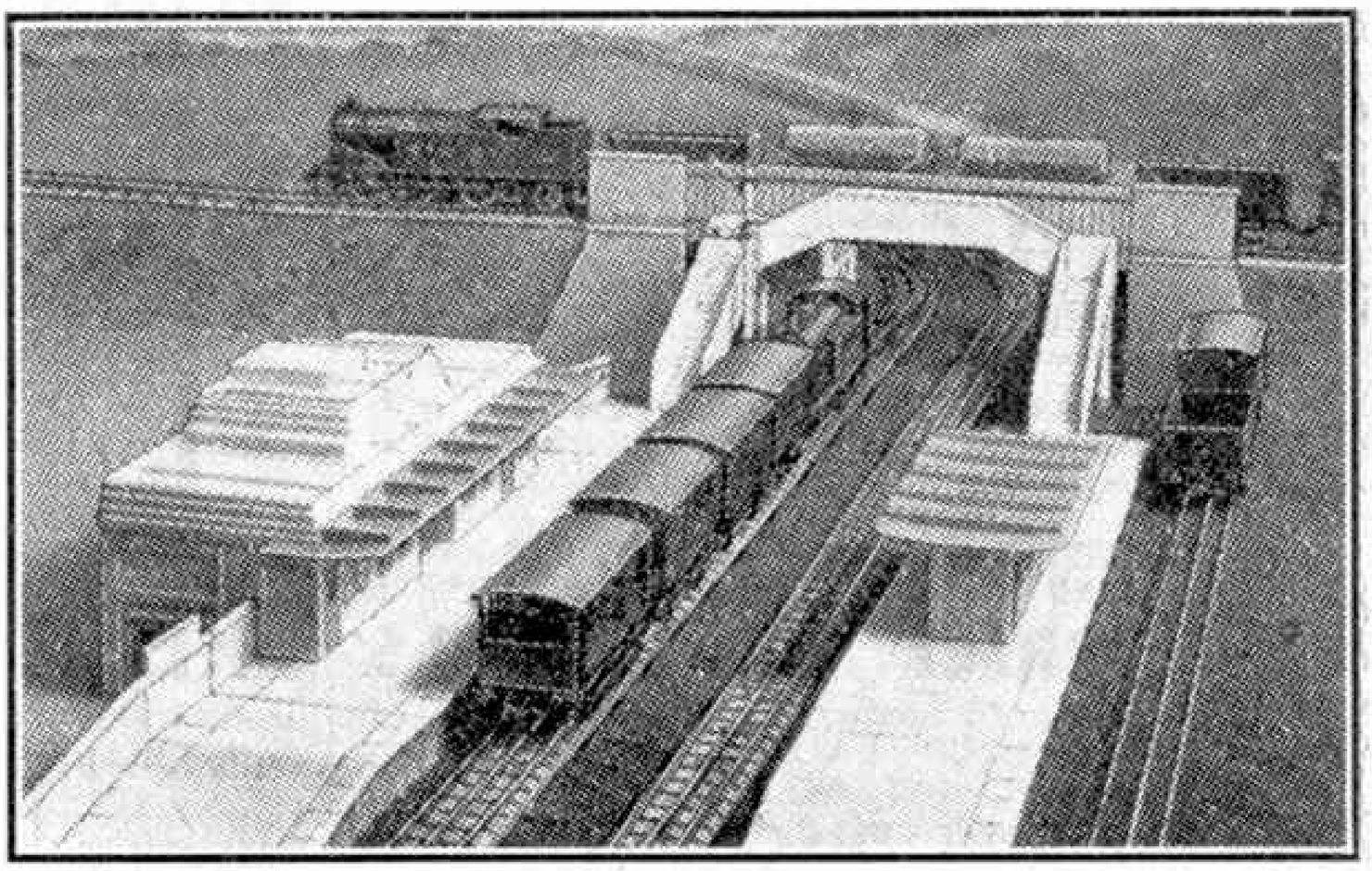
Station Schemes in Hornby-Dublo

MANY miniature railway owners will be familiar with the Hornby-Dublo Through Station and the Island Platform introduced last year, even though all may not yet have been able to equip their layouts with these fine, modern-looking buildings. These splendid accessories can be used in various ways according to the requirements of the layout. Each can be used alone; or different combinations of the two types can be arranged with very pleasing results. The platform lengths correspond, and the general style and finish of the buildings agree.

In the upper illustration on this page we see a Through Station and an Island Platform used together to make a three-road station. The Through Station serves one main line track while the Island Platform serves the other; in addition, however, it provides platform accommodation for the dead-end or buffer-stop road on the right-hand side of the picture.

This use of the two types of buildings together is quite a useful scheme and one that is frequently found on many Hornby-Dublo systems. To complete matters the Dublo Footbridge, another effective accessory, which is of sufficient span to pass across double track, is placed at the platform ends in order to connect the two sides of the station.

In a similar manner two of the Through Stations can be used, one on each side of a double-track railway. This arrangement

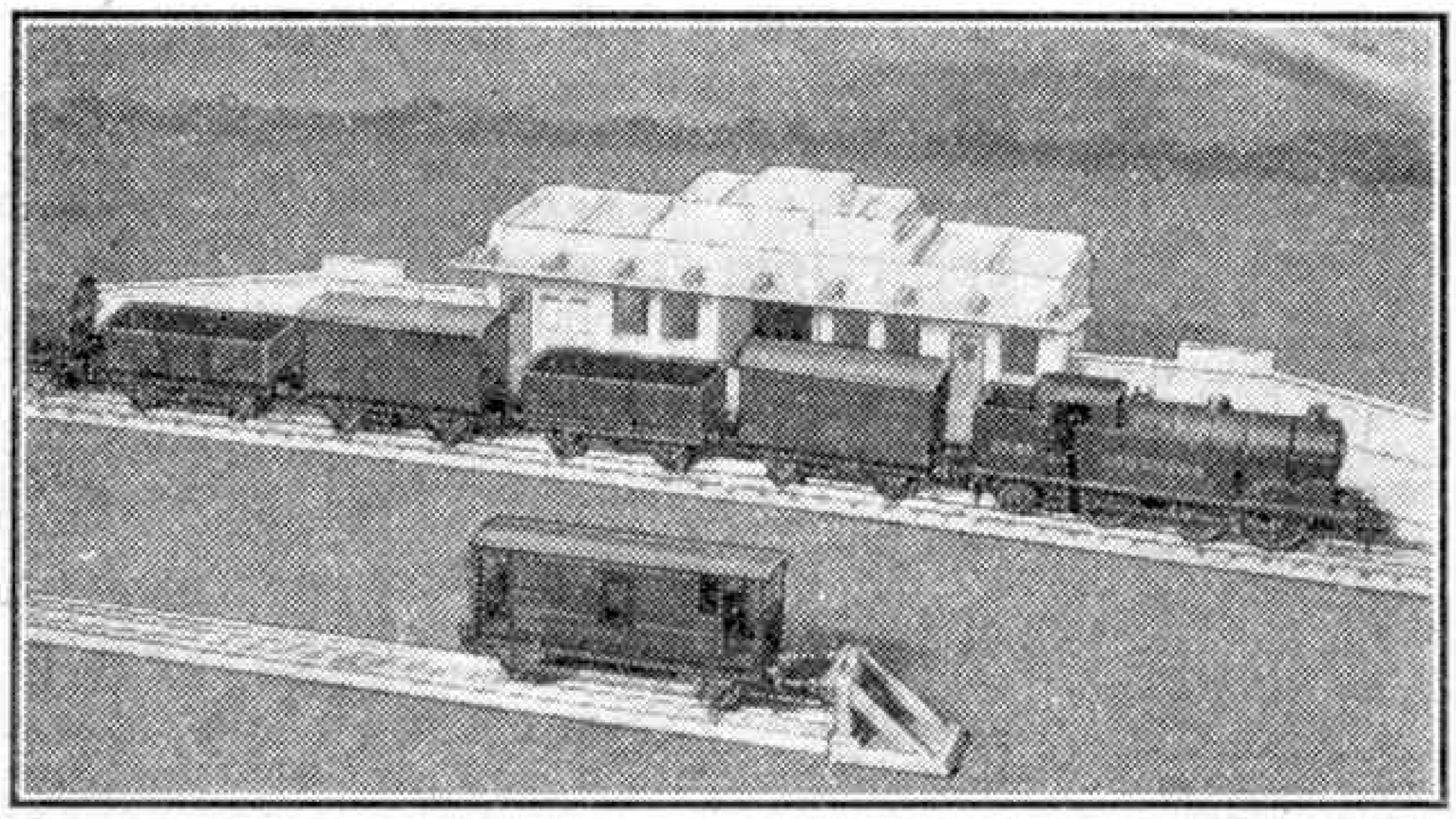


An interesting two-level situation on a Hornby-Dublo system. On the lower main line a Through Station and an Island Platform are used together as suggested on this page.

has quite an imposing effect and can be used for the more important wayside stations. Again, two Island Platforms can be employed where there are four tracks to be served, each Platform being situated between the inner and the outer tracks on each side of the complete station so formed.

Either the Through Station or the Island Platform can appear on its own alongside a single track railway, and the lower illustration shows a typical situation. For simple layouts and branch lines the Island Platform is sufficient, the Through Station can be reserved for more important locations.

Associated with any station scheme is the signal cabin. The Hornby-Dublo Signal Cabin is an attractive building similar in style and structure to the stations. It should be placed as a rule somewhere near the platform end.



A mixed goods train passing the Hornby-Dublo Through Station. The presence of the Brake Van on the adjoining siding strikes a realistic note.

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For other Stamp Advertisements see also pages 474 and xvi.

Stamp Collecting

Pictorials from Dominica

By F. Riley, B.Sc.

ONE of the most interesting islands of the West Indies is Dominica. This island is one of the chain that stretches in a great arc from Porto Rico to British Guiana. Formerly it was included in the Windward Islands, that is those meeting the prevailing winds from the Atlantic Ocean, but 11 years ago it was transferred to the Leeward group, which curves to the north west away from the ocean winds, a position that gives these islands their name.

The West Indies have played a great part in British naval history, especially during the 18th century, when there were recurring struggles between Great Britain, France and Spain for the possession of the islands, chiefly regarded then as sources of sugar. Many of them changed hands on several occasions, and famous battles were fought in the waters surrounding them. Nelson was stationed in the West Indies at one period of his career, and everyone knows of his famous voyage there before Trafalgar in search of the French fleet under Villeneuve, which had sailed to the islands under Napoleon's orders to entice the British away from the English Channel. The Emperor's plan miscarried. When the French ships returned to Europe Nelson was soon upon their trail again, and in the end he crushed the opposing fleet in the great sea fight of Trafalgar.

If Nelson had met the French in the West Indies he would have attacked them immediately and no doubt would have secured as great a victory as that of Rodney 23 years earlier. In this fight the British Admiral crushed a great French fleet that had disputed British naval supremacy in the West Indies for a considerable time, and it ranks as one of the most complete and decisive in history. It was won by what was then a new manœuvre, Rodney cutting through the French line of battle, as Nelson was to do with even greater effect at Trafalgar.

Rodney's battle was fought in the seas around Dominica, the stamps of which are the subject of this article, but so far there has been no stamp of the island to commemorate this fact. Most of the earlier issues, beginning in 1874, were of the usual colonial portrait variety, although one series, issued in 1903, showed a view of the island from the sea, while 20 years later appeared an interesting stamp with the head of King George V and a sea scene respectively, in two oval frames of equal size, side **by side.**

There was also the Houses of Parliament stamp, in two values, to celebrate victory in the recent World War, but the first real break with the portrait stamp came in 1938 with a long issue of 10 stamps, to which four other values were added in November 1947, making 14 in all. Now another long pictorial set, of 15 values, has been issued. There were only four designs in the 1938 set, but in the new one there are 12. Another interesting difference is that the recent issue is in the new currency of dollars and cents instead of the shillings and pence of the 1938 issue. The first Dominican issue with the new currency was the U.P.U. set of October 1949.

The island lends itself well to the production of an attractive pictorial set, its tropical scenery and its inhabitants with their interesting occupations both contributing suitable subjects. It is about 29 miles long and 15 broad, of volcanic origin, mountainous and picturesque. The highest summit of the Caribbean chain, 5,314 ft. above sea level, is to be found on the island. Its streams are fairly well stocked with fish, and there is a large area of fertile soil that is under intensive cultivation.

In the warmth of this tropical island fruits such as the lime, the orange and the banana flourish, while cocoa and vanilla also are grown on a large scale. These products of the island provide the subjects for several of the stamps of the new issue. Dominica has long been famous for its limes. A plantation of limes is illustrated on the 3 c. and 48 c. stamps of the present set and three values of the 1938 issue showed the fruit being picked. Lime juice and other lime products have long been important products of Dominica. Orange picking is illustrated on the 4 c. value, and also in slightly different form on the $2.40 stamp, which is a vertical one. The drying of vanilla beans is depicted on the 8 c. value, while the 1 c. stamp shows one of the centres in which cocoa beans are spread out to dry. On the 5 c. stamp there is a very tantalising heap of bananas to illustrate the growth of this popular fruit, for many years almost a luxury with us. The 2 c. value illustrates the making of baskets by Caribs, Indians who make up about 400 of the total population of nearly 52,000.

The 1938 issue included stamps illustrating two well-known natural features of

(*Cont. p. 478*)

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For other Stamp Advertisements see also pages 472 and xvi.

Stamp Gossip

and Notes on New Issues

By F. E. Metcalfe

FEW countries give visitors more surprises than Iceland. Perhaps it is the name that is the reason, for Iceland sounds so shivery that all one expects to find there are snowdrifts and glaciers. That is just where the surprise comes in, for among other things this island produces some of the finest mutton in the world, and certainly more than ice is needed to fatten sheep on.

It is well known that this northern country had an elected parliament before we had one ourselves, but it is not as well known that Iceland established its official postal service as long ago as 13th May 1776. It was to commemorate the 175th anniversary of this event that two stamps were issued, one of 2kr. illustrated here, of which 500,000 were put on sale, and the other of 3kr. The total printing of the latter stamp was 400,000.

Iceland has been an independent republic since 17th June 1944, but in those early days it was attached to Denmark and the stamp illustrated shows a carrier of the official mail, which when it left the country was mostly destined for Copenhagen, the capital of the mother country. Iceland stamps are generally printed in England. As quite a few have been produced since the first issue in 1873, it is now fairly easy to get together a nice little showing. This is probably the reason why Icelandic stamps are growing in popularity in our own country.

From time to time the Crown Agents in London advise in their official bulletin that a new set of stamps has been ordered for one of the colonies. Then it's just a case of waiting for them, anything from three months to a year or so. The time varies a good deal, for the new set for Sudan has been in preparation for a couple of years.

Apparently Sudan likes to take its time in matters philatelic, for the camel design set that the new stamps are replacing has been on sale for over 50 years. Yes, ever since 1898. It is true that there was a slight alteration in the design in 1948, for after all that time it was noticed by an American professor that there was a mistake in the Arabic inscription at the foot of the stamp. This was rectified, and off the set went again; but alas for old things, from 1st September letters from Sudan will bear new stamps with all kinds of designs. The camel design has been retained for the top value, 50p., however.

As a contrast to this, as recently as May the Crown Agents announced a commemorative set of stamps for Malta, and this was actually placed on sale on 12th July. The stamps were issued to commemorate the 7th centenary of the Scapular. The design shows the Virgin Mary in the act of handing the Carmelite Scapular to St. Simon Stock in 1251. Recently designers have been getting away from the usual formal designs characteristic of British stamps, and it must be admitted that these have often been trite. We saw this trend in the St. Lucia "Castries" stamp, and it is again noticeable in the "Scapular" issue.

A great contrast to all this is to be found in the set issued by the Russian Zone of Germany to commemorate the so-called German-Chinese friendship. There are three stamps in the set. Two depict Mao-Tse-Tung, the Chinese leader, who certainly cannot be as bad as the stamp makes him appear, and the third shows what seems to be a quarrel between German people and Chinese. It would be interesting to know what some of those race-conscious eastern Germans really think about friendship with the Chinese. But the set is significant, for it is another instance of the many uses to which stamps are put.

Although we have already illustrated one stamp this month with a religious motif, the Malta set, Greece has recently produced such a beautiful set that one cannot resist showing one of these stamps. This was issued to commemorate St. Paul's mission to Greece 1,900 years ago.

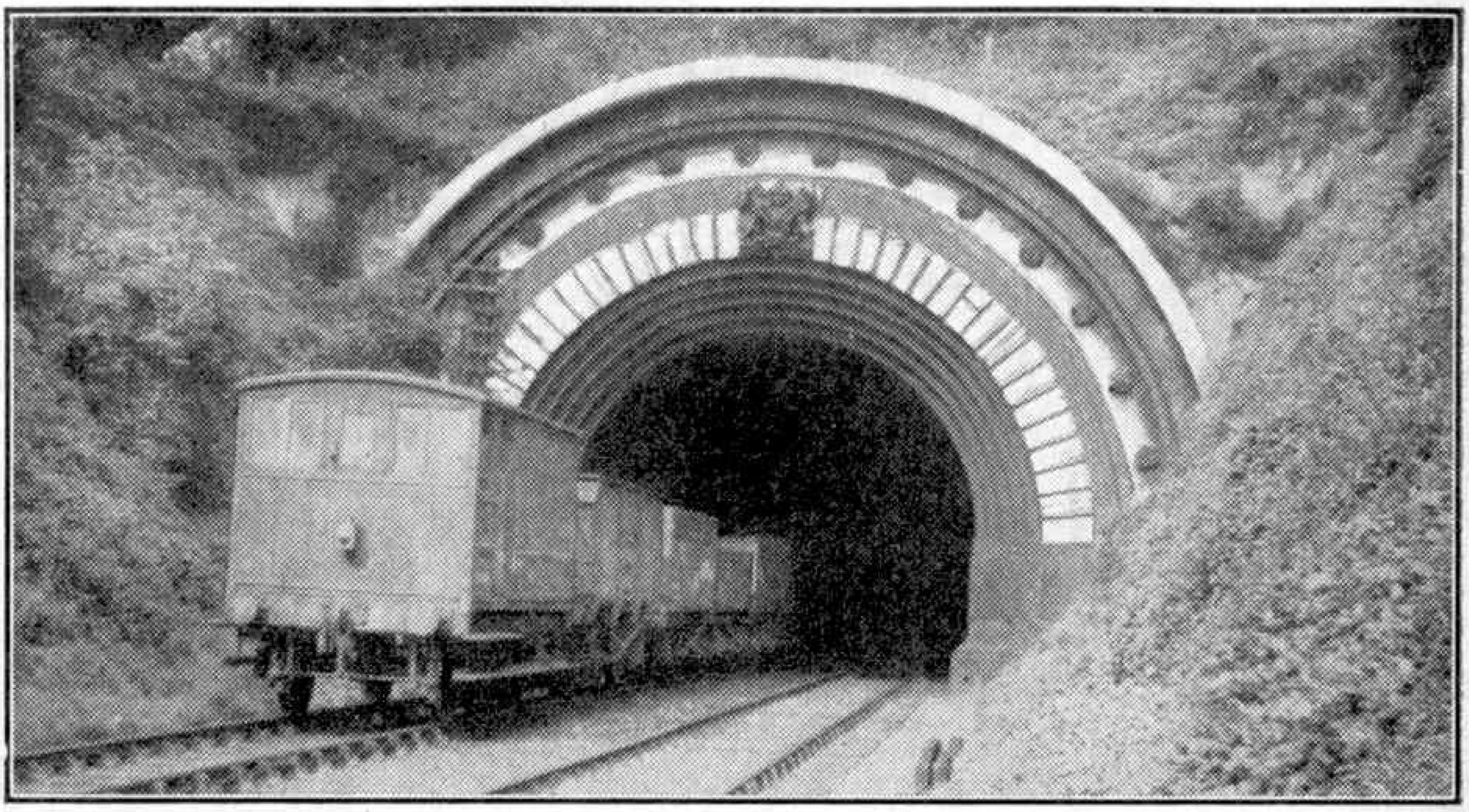
There are four stamps in it and the one illustrated is the most striking. What a wonderful country Greece still is! Many of us when we left school, remembering the trouble its history had given us, felt a grudge against it rather than love for its glories. Yet one has only to pay a visit, however short, to this country of countries, to feel at once, in one's very bones, all that Greece has really meant to us, and a set such as this revives many memories.

The writer of these notes still remembers his first visit to Athens. He arrived with some friends in the late afternoon. The Sun was slowly sinking, and after a hurried cup of tea all bundled into a taxi so that the Acropolis could be visited before it closed at sundown. Up the hill we dashed, just reaching the gates before a soldier closed them for the night. As a matter of fact the gate was actually closed as we reached it, but nothing could keep us out; certainly not a single soldier, and in we streamed. The writer sat by himself and quietly gazed over Athens. What pictures were conjured up! How worth all that long journey from England were those few silent moments!

Competitions! Open To All Readers

Prize-winning entries in "M.M." competitions become the property of Meccano Ltd. Unsuccessful entries in photographic, drawing and similar contests will be returned if suitable stamped addressed envelopes or wrappers are enclosed with them.

A "Boring" Contest



Don't worry, this "boring" contest will not weary readers. It is concerned with the bores through which trains pass under hills and high ground generally. and they are always interesting, as is shown by a glance at our illustration of Audley End Tunnel, Eastern Region, from a photograph by R. E. Vincent.

Below we give clues to the names of 10 railway tunnels, and readers are asked to name them, to give their positions and to state their Regions.

1. The high ground is tinted by the sunset.
2. Jacob's Pillow?
3. Soon to be smokeless.
4. Nowhere near the battle or station.
5. In England, not a foreign capital.
6. Doesn't look like a few trees.
7. Queer thing for a monk to own.
8. Source of drinks for the sheep?
9. A source of slate or stone.
10. No flowery hill now.

There will be two sections, for Home and Overseas readers respectively, and in each prizes of 21/–, 15/– and 10/6 will be awarded for the best entries in order of merit. If there is a tie the novelty and neatness of the entries will be taken into account.

Entries should be addressed *"October Tunnels Contest, Meccano Magazine, Binns Road, Liverpool 13."* Closing dates: Home Section, 30th November; Overseas Section, 29th February, 1952.

Festival Drawing Competition

Thousands of *"M.M"* readers have visited the South Bank Exhibition during the Festival of Britain season, and others have seen countless pictures of the Skylon, the Dome of Discovery and other features of the display. In this contest we ask them to send in drawings of anything of interest that has been seen in the Festival grounds. The name, address and age of each entrant must be stated on the back of his drawing.

There will be four sections altogether, two for Home readers and two for those Overseas, and in each case there will be Senior and Juuior Sections, for readers of 15 years or more and for those under 15. In each section prizes of 21/–, 15/– and 10/6 will be awarded for the best entries in order of merit, with consolation prizes for other good efforts.

Address your entries *"Festival Drawing Contest, Meccano Magazine, Binns Road, Liverpool 13."* Closing dates: Home Section, 30th November; Overseas Section, 29th February, 1952.

October Photographic Contest

The tenth of our 1951 series of photographic contests is a general one in which we invite readers to submit prints of any subject. Each competitor may submit only one photograph, which must have been taken by him, and on the back of his print must be stated exactly what the photograph represents.

The Competition will be in two sections, A for readers aged 16 and over, and B for those under 16. Each competitor must state in which section his photograph is entered. There will be separate Overseas Sections, and in each section prizes of 21/–, 15/– and 10/6 will be awarded. Entries should be addressed *"October Photographic Contest, Meccano Magazine, Binns Road, Liverpool 13."* Closing dates: Home Section, 31st October; Overseas Section, 31st January, 1952.

Competition Results and Solutions

HOME

MAY 1951 CROSSWORD PUZZLE

1st Prize: A. B. Partridge, Northampton. 2nd Prize: J. W. Tym, Rhyl. 3rd Prize: W. Prior, Nottingham. Consolation Prizes: J. G. Gosling, Liverpool; I. Bradley, Knaresborough; R. Hawton, Plymouth; J. Fraser, Kirkcaldy.

MAY 1951 AIRCRAFT NAMES CONTEST

1st Prize: C. T. Dennison, Bishop's Stortford. 2nd Prize: A. P. Allchin, Clacton-on-Sea. 3rd Prize: J. Mills, Ware. Consolation Prizes: D. Beckett, Huntingdon; P. M. J. de Carteret, Jersey, C.I.

JUNE 1951 PHOTOGRAPHIC CONTEST

1st Prize, Section A: T. McCleary, Belfast; Section B: J. P. B. Nichol, Cambridge. 2nd Prize, Section A: C. Y. Rennick, Newcastle-on-Tyne; Section B: B. Fuggle, Helston. 3rd Prize, Section A: P. Lambert, Harrogate; Section B: H. L. Goldingham, Taunton. Consolation Prizes, Section A: R. R. Bushell, Hoddesdon; J. L. Springett, London S.E.20; A. Shearer, Ayr; J. F. W. Paige, Chelsfield. Section B: D. J. Roulston, Bangor, N.I.; D. Scurrah, Middlesbrough; C. Mason, Middlesbrough; B. A. Cook, Patchway.

JUNE 1951 NOVEL DRAWING CONTEST

1st Prize, Section A: J. R. Edwards, Greenford; Section B: G. Bessford, Alnmouth. 2nd Prize, Section A: R. J. Sowersby, Urmston; Section B: N. Guppy, York. 3rd Prize, Section A: L. A. Cockrill, Coventry; Section B: L. Yandell, Gloucester. Consolation Prizes, Section A: L. C. Bond, Wellington; N. Huntley, Doncaster; M. R. Burnett, Alderney, C.I.; Section B: D. Lawrence, Knutsford; S. W. Croxtall, Leicester; C. Williams, Chester.

JUNE 1951 LOCOMOTIVE CONTEST

1st Prize: G. H. Brown, Huddersfield. 2nd Prize: J. S. Line, St. Albans 3rd Prize: D. M. O. Ball, Oldham. Consolation Prizes: K. Edgar, Crieff; E. F. Good, Malvern; C. J. Burnley, Castletown.

OVERSEAS

JANUARY 1951 COVER VOTING CONTEST

1st Prize: R. Cowie, Wakari, N.Z. 2nd Prize: D. Clark, Bulawayo, S. Rhodesia. 3rd Prize: R. E. Matthews, Alliance, Canada. Consolation Prizes: J. A. Boland, Dublin, Eire; E. H. Leak, Ermelo, S. Africa; T. Wood, Umtali, S. Rhodesia; J. D. Brown, Greymouth, N.Z.

JANUARY 1951 LOCOMOTIVE PAINTING CONTEST

1st Prize: D. J. R. O'Shea, Kenmare, Eire. 2nd Prize: J. W. Belderson, Maseru, S. Africa. 3rd Prize: J. Davies, Salta, Argentina. Consolation Prizes: M. M. Smyth, Berne, Switzerland; G. W. Robinson, Ostend, Belgium.

FEBRUARY 1951 GO AS YOU PLEASE DRAWING CONTEST

1st Prize, Section A: H. W. Kensley, Goodwood, S. Africa; Section B: J. Nelles, Mt. Hamilton, Canada. 2nd Prize, Section A: L. V. Clarke, Dunedin, N.Z.; Section B: R. McCoy, Dublin, Eire. 3rd Prize, Section A: B. E. Lockwood, Masterson, N.Z.; Section B: M. J. Ring, Mt. Eden, N.Z. Consolation Prizes: T. J. Weight, Melbourne, Australia; E. M. McLennan, Calgary, Canada; K. Jones, Brisbane, Australia; D. Fraser, Bombay, India.

FEBRUARY 1951 RAILWAY QUIZ

1st Prize: D. G. Monteith, Hamilton, N.Z. 2nd Prize: L. G. Poole, Melbourne, Australia. 3rd Prize: D. Lea, Bombay, India. Consolation Prizes: C. R. Roberts, Lisbon, Portugal; J. B. Black, Hanover, Germany; R. Rogers, Paris, France.

FEBRUARY 1951 PHOTOGRAPHIC CONTEST

1st Prize, Section A: M. Breeze, Rotterdam, Holland; Section B: W. P. Gabriel, Otago, N.Z. 2nd Prize, Section A: C. O. D. Ekwensi, Yaba, Nigeria; Section B: G. Shierlaw, Canterbury, N.Z. 3rd Prize, Section A: C. R. Popperwell, Hanover, Germany; Section B: A. Hopkins, Dublin, Eire. Consolation Prizes: H. Baudach, Transkei, S. Africa; B. Hargreaves, Moascar, Egypt; E. T. Pritchard, Lyons, France; T. Williams, Richmond, Canada.

MARCH 1951 PRICE CODE CONTEST

1st Prize: M. Johnston, Richmond Hill, Canada. 2nd Prize: L. T. Gamblin, Christchurch, N.Z. 3rd Prize: L. Dickson, Pretoria, S. Africa. Consolation Prizes: D. J. R. Campbell, Canterbury, N.Z.; S. Mukherji, Gorakhpore, India; H. Snyder, Pretoria, S. Africa.

MARCH 1951 RAILWAY CONTEST

1st Prize: D. C. Jones, Sudbury, Canada. 2nd Prize: W. T. Miller, Greymouth, N.Z. 3rd Prize: T. Newlands, Dublin, Eire. Consolation Prizes: P. Appleton, Bombay, India; E. J. Morris, Pretoria, S. Africa; B. E. Barker, Colombo, Ceylon.

SOLUTIONS

NOVEMBER 1950 FIGUREWORD CONTEST

Girder, Collar, Socket, Pulley, Swivel, Clutch, Flange.

DECEMBER 1950 ADVERTISEMENT CONTEST

Bayko, Bond, Brylcreem, Curtis, Dunlop, Dyke, Gamage, Hamley, Hornby, I.C.S., Judo, Meccano, S.E.L., Selfridge, Spear, Windsor, Wright.

DECEMBER 1950 AIRCRAFT CONTEST

Chipmunk, Hastings, Attacker, Marathon, Shetland, Mosquito, Gyrodyne, Canberra.

JANUARY 1951 COVER VOTING CONTEST

1st: June; 2nd: January; 3rd: April; 4th: July; 5th: December; 6th: August; 7th: May; 8th: September; 9th: February; 10th: October; 11th: November; 12th: March.

May 1951 Crossword solution

Petrol Round the World—(*Continued from page 436*)

interesting to find that the position of these in Great Britain is different from that in the United States and on the Continent. Abroad the oil companies operate road filling stations at which only their own particular blends are available; in Great Britain the filling stations and garages are independent concerns, most of which normally stock the products of more than one of the rival companies.

Filling the tanks of aircraft requires special consideration, and at airfields all over the world the oil companies maintain depots where there are special refuelling vehicles designed to replenish aircraft supplies at high speed. A typical tank car used in refuelling large aircraft has a capacity of 2,500 gallons of aviation spirit, which it can deliver into the tanks at the rate of 400 gallons a minute. A similar service is operated for flying boats, the refuellers used being in effect miniature tankers.

New Meccano Model—

(*Continued from page 467*)

$\frac{3}{8}$" Bolt attached by nuts to the bucket side. A $\frac{1}{2}$" Bolt 31 engages the trap, but is held clear when the operating Cord 35 is hauled in. The bucket guides are two $2\frac{1}{2}$" Angle Girders on each side. These are bolted together in pairs by their slotted holes, so that a gap wide enough to slide freely over the Angle Girders of the boom is left between their shorter flanges. The guides are attached to $2\frac{1}{2}$" Flat Girders fixed to the bucket.

The operating Cord is tied to the front of the bucket and passed round a $\frac{1}{2}$" loose Pulley 32. It is then taken round a $2\frac{1}{2}$" Rod 33, and over a 1" loose Pulley on $2\frac{1}{2}$" Rod 34. Then it is passed three or four times round its drum, and led over a second 1" Pulley on Rod 34, under Rod 33 and tied finally at the back of the bucket.

The front of the cab is completed by a $5\frac{1}{2}" \times 3\frac{1}{2}"$ Flat Plate, and the rear consists of $5\frac{1}{2}" \times 2\frac{1}{2}"$ Flexible Plates curved to the radius of the $5\frac{1}{2}"$ Curved Strip and attached to the sides by Angle Brackets. The roof is formed by two $5\frac{1}{2}" \times 2\frac{1}{2}"$ and four $5\frac{1}{2}" \times 1\frac{1}{2}"$ Flexible Plates, and is fixed to Angle Brackets bolted to the sides.

Stamp Collecting—(*Continued from page 473*)

Dominica that are seen also on the 12 c. and $1.20 c., and on the 24 c. values respectively of the present pictorial set. These are Fresh Water Lake and the Boiling Lake, both reminders of the volcanic nature of the island. The first occupies an extinct crater about 3,000 ft. above sea level and is believed by the natives of the island, who have a dread of it, to be bottomless. The boiling lake is actively volcanic.

Of the remaining stamps of the issue the 6 c. value shows the botanical gardens in Roseau, the capital. These cover about 40 acres, in beautiful surroundings, and they are claimed to be the most luxuriant and beautiful of their kind in the West Indies. The lowest value of all, $\frac{1}{2}$ c., is a portrait stamp of H.M. King George VI, similar to the $\frac{1}{4}$d. stamp of 1940.

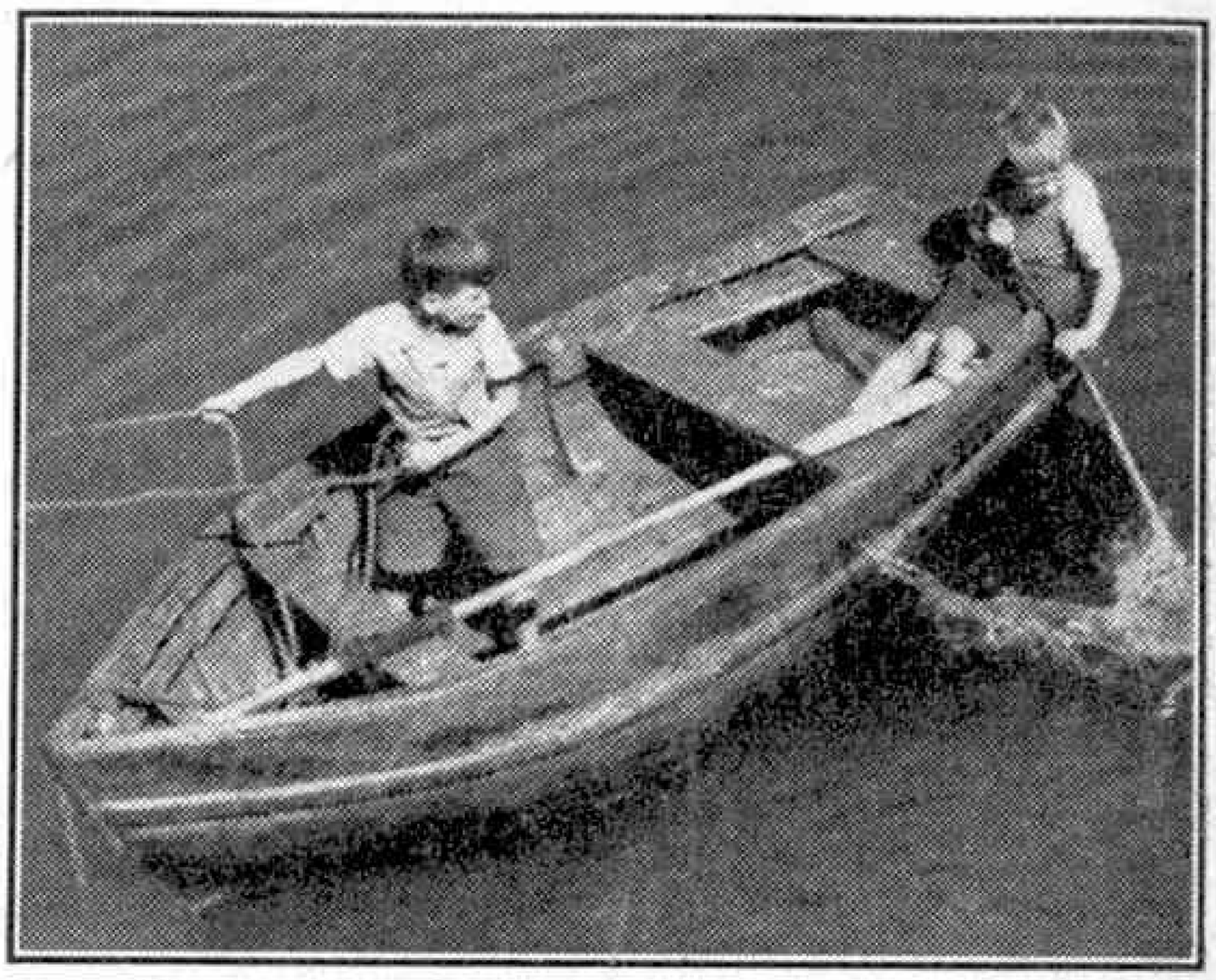
Introducing the "Pack Plane"—(*Cont. from page 450*)

Berlin Air Lift, supplies could have been flown by "Pack Plane" direct from the U.S.A. or Britain to airfields in the Western Sectors of Germany. There the Packs could have been transferred quickly, without unloading, to big helicopters like the XH-16 and ferried to the heart of Berlin. We can only hope that such a major operation will never again be needed; but whatever the future may hold, it seems certain that we shall see a lot more of the "Pack Plane."

By Midland to Manchester—

(*Continued from page 440*)

Matlock gorge. Before Matlock, where we stop, we pass under High Tor in successive tunnels of that name. Darley Dale is succeeded by Rowsley, an important marshalling centre we are perhaps surprised to find in such striking surroundings.



"The Adventurers." This excellent entry from the "M.M." June 1951 Photographic Contest is by L. H. Hobbs, Dartmouth.

Now we part company with the River Derwent, which is succeeded by the Wye. We pass close to romantic Haddon Hall but we do not see it as we have to go through Haddon Tunnel, a covered way provided it is said, to conceal the railway at this point. Up past Bakewell and Great Longstone we climb steadily into the High Peak district. Then with a rush down through Headstone tunnel we are suddenly ushered out into the breath-taking beauty of Monsal Dale and find ourselves high above the River Wye on the graceful arched viaduct pictured on the cover to this issue. Fine views alternate with tunnels over this length especially, as we press on up at 1 in 100 and then stop at Miller's Dale after a short descent at the same inclination. After starting again, practically from Miller's Dale Junction, where the Buxton line goes off, we have a 3-mile stretch at 1 in 90 up to Peak Forest, passing through picturesquely-named Great Rocks Tunnel on the way. Once over the summit we descend, again at 1 in 90, and enter lengthy Dove Holes tunnel cut through solid rock.

Our engine has finished its hard work now for the line falls practically all the way to Manchester. After the Chinley junctions, another triangular layout, another scenic route joins us, the Sheffield line from Dore and Totley. After a smart stop at Chinley station, Buxworth and New Mills are passed and we leave Derbyshire for Cheshire and are soon enveloped in the gloom of Disley Tunnel over 2 miles long.

On leaving it we find the scenery quite different; through the suburbs into busy Lancashire we go, just beyond Cheadle Heath. Finally, easing gently over Throstle Nest Junction, we are led over a viaduct and round the curved approach to Manchester Central, the all-over arched roof of which reminds us of St. Pancras, now 189½ miles away.

We regret that we omitted to state that the illustrations to the article "The Tramp and her Work" by Frank C. Bowen in our August issue were by the Nautical Photo. Agency.

Fireside Fun

"Yes, the old bull wanted to go one way, and I wanted to go the other."
"Well, how did you settle it?"
"Oh, he tossed me for it."

* * * *

"You mean to say you fell from the top floor and weren't hurt?"
"Yes. I was lucky—I fell inwards!"

* * * *

"My boy, give up smoking, as I have done. Saves you pounds."
"But you haven't given up. You have just smoked two of my cigarettes."
"Oh, yes. I'm doing it gradually, you see, only smoking cigarettes I get from other fellows. Less risk of shock that way."

* * * *

"You must be very brave to take all those risks," said the old lady to the lion tamer.
"No, not really, but it is a bit dangerous. I am bronchial you see, and those cages are awfully draughty."

* * * *

"Tommy, this homework isn't in your usual writing. Did you do it yourself?"
"Er . . . . please, miss, I used my father's fountain pen."

* * * *

"We girls never get a look in at church. It's always "Amen" there, and never "Awomen."
"Yes, and its always a hymn they sing, not a her."

* * * *

"Will this be for you? It's your address, but the name's obliterated."
"Can't be for me. My name's Green."

BRAIN TEASERS

TRY THIS ALL WAYS

Here is a plan of a stable with separate boxes, each just large enough to accommodate one horse. Can you put 10 horses into it?

Yes, I know how many boxes there are. If the number had been 10 anybody could have done it.

D.E.

* * * *

THE RIGHT PRODUCT

The addition puzzle in last month's issue, the solution of which is given below, was very popular with readers, so this month I give a multiplication sum in which letters again represent numbers. Here it is:

```
          C C A B O
        -       L A E
        ---------------
          C C A B O
      L C D M L N
      P A O B N
    -------------------
    M E C C A N O
```

This may be a little harder, but the result of multiplication is so pleasing that I am sure every reader will try to solve it.

V.A.D.

* * * *

"Can I go out and play with Jackie Brown?"
"No! You know I don't like him."
"Well, can I go out and fight him?"

* * * *

SOLUTIONS TO LAST MONTH'S PUZZLES

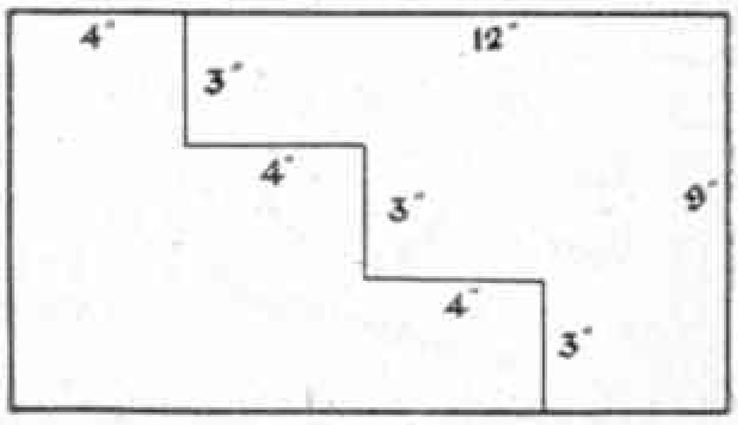
When a three-figure number is treated as shown in our first puzzle last month the middle figure of the result is always nine and the other two add up to nine. The only exception to this is when the first and last figures of the original number are the same. The difference then of course is 0.

The diagram in the corner shows how to cut a piece of wood measuring 16 in. × 9 in. into two pieces to make it fit a window 12 in. square. The second piece is just "stepped-up" on the first.

The solution of the third puzzle last month was as follows:

```
  9647
   587
------
 10234
------
```

The words of the heading "Face the "Music," can be used in place of "Make One Trick."



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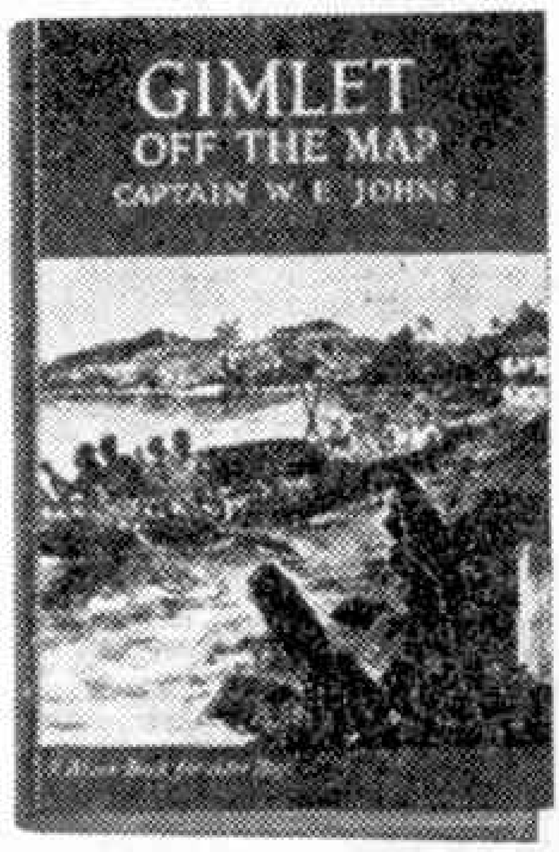
GIMLET OFF THE MAP



by CAPT. W. E. JOHNS the author of "BIGGLES"

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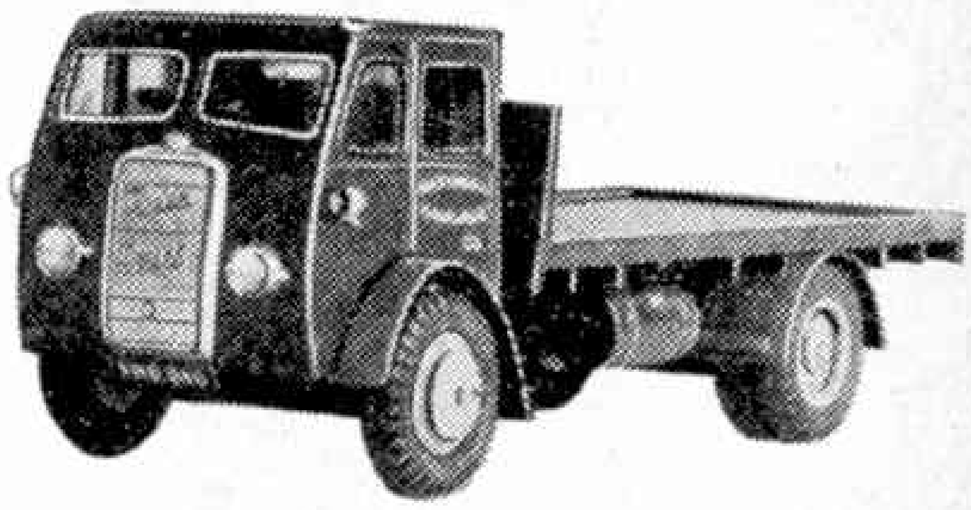

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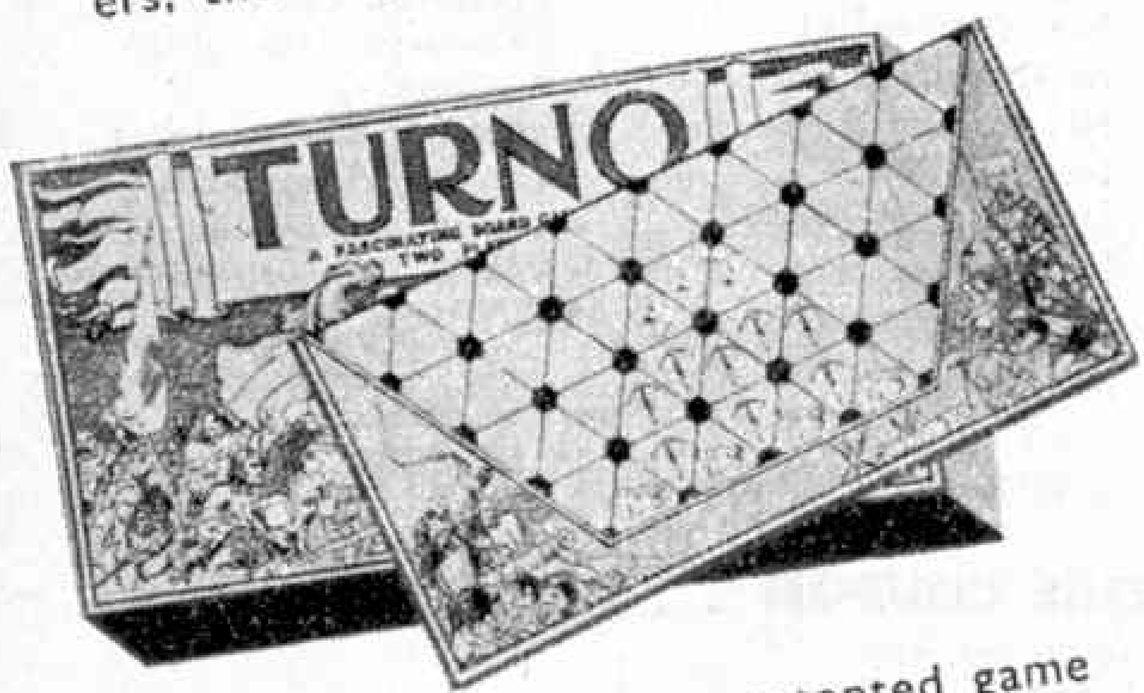

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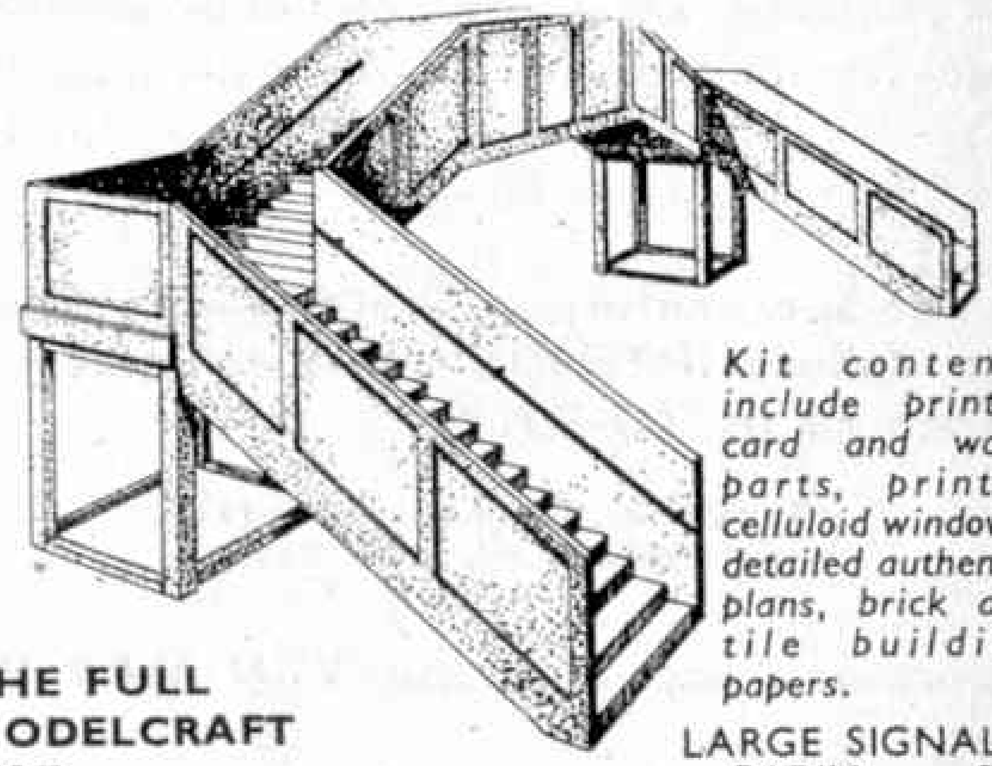

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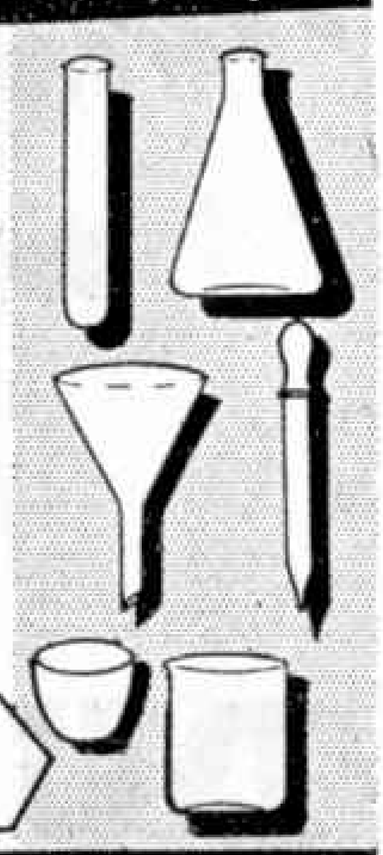

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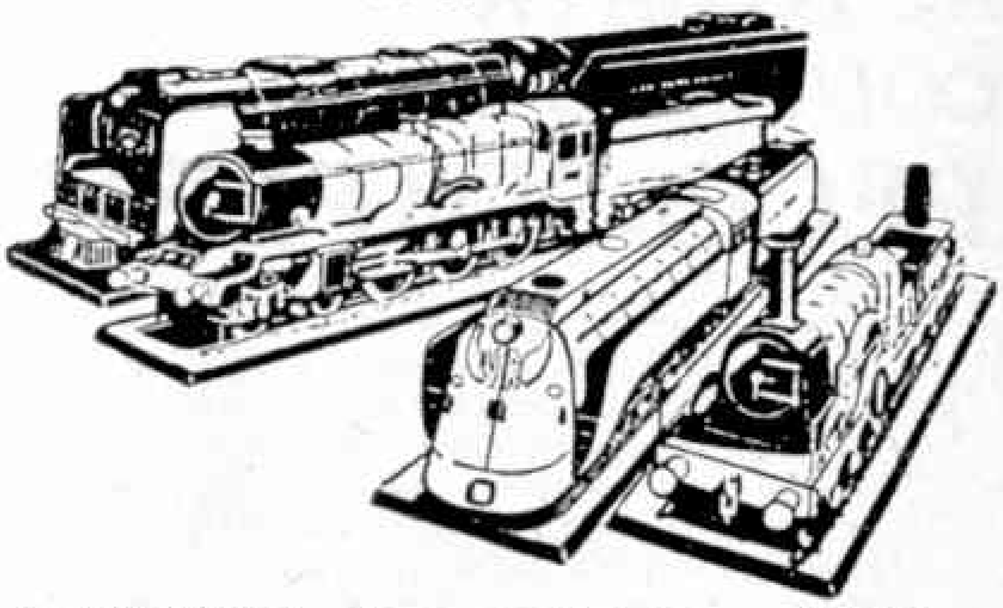

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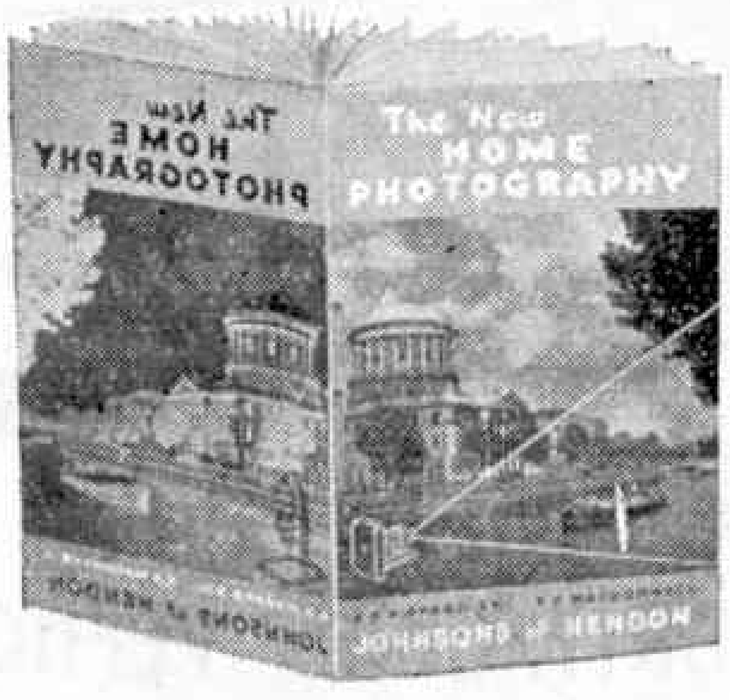

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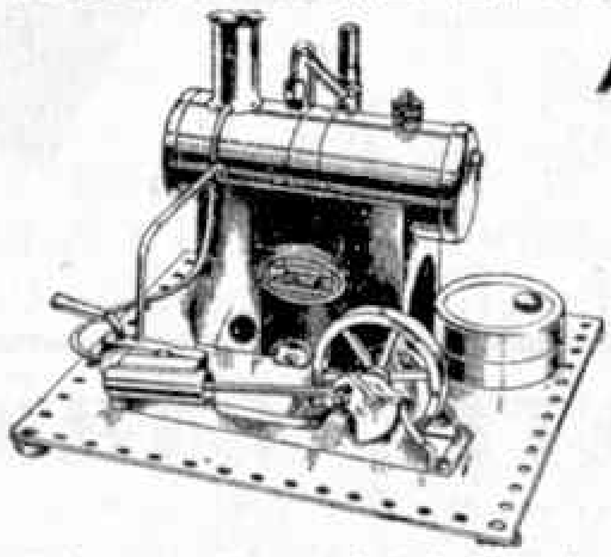

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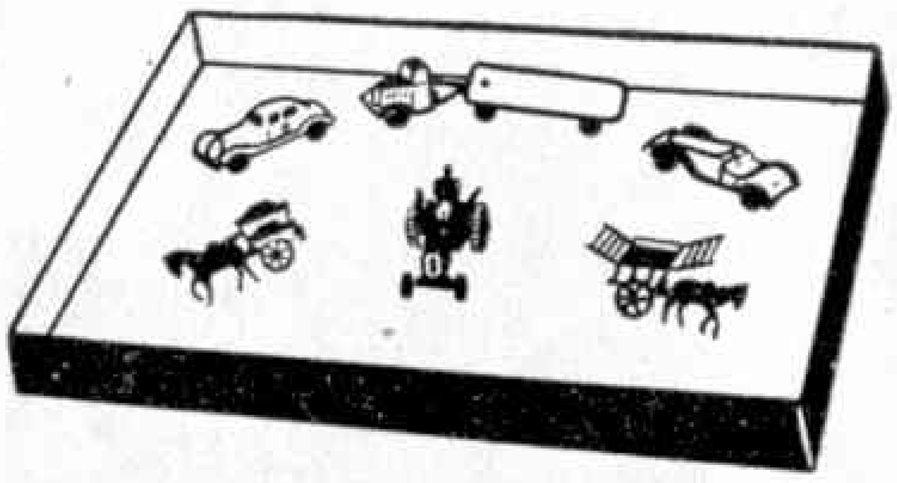

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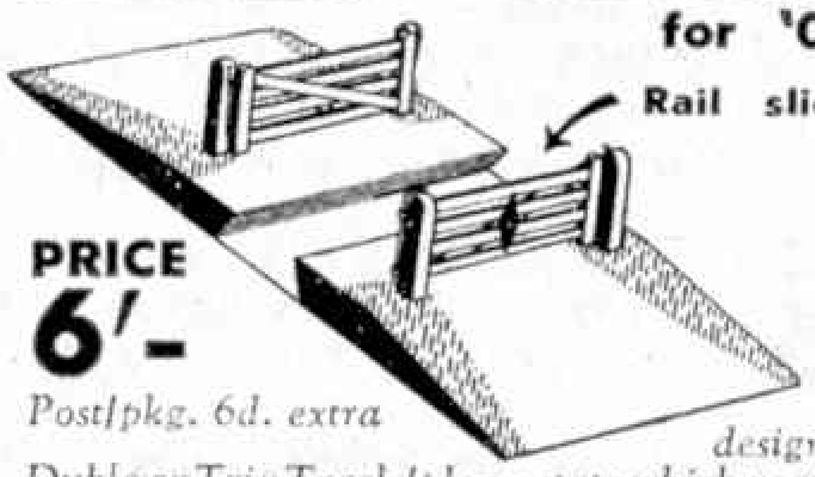

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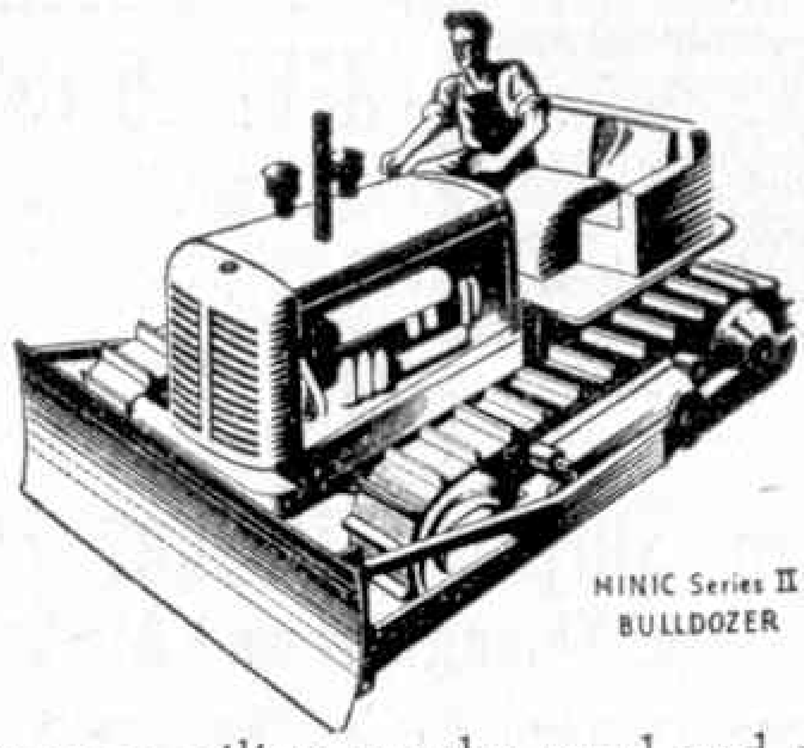

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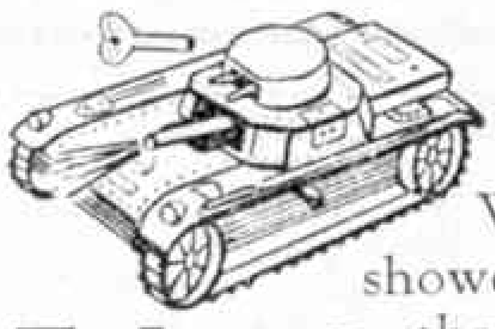

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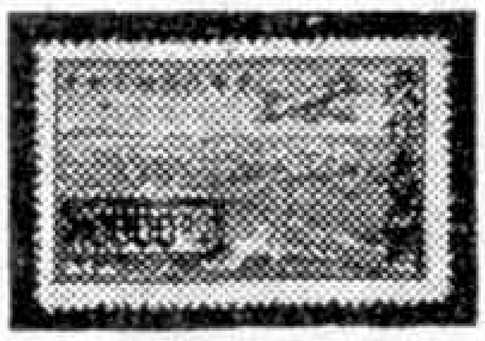

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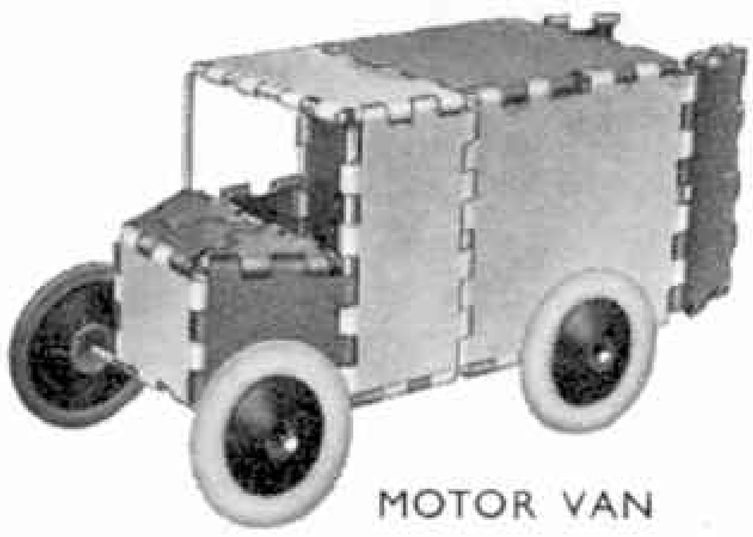

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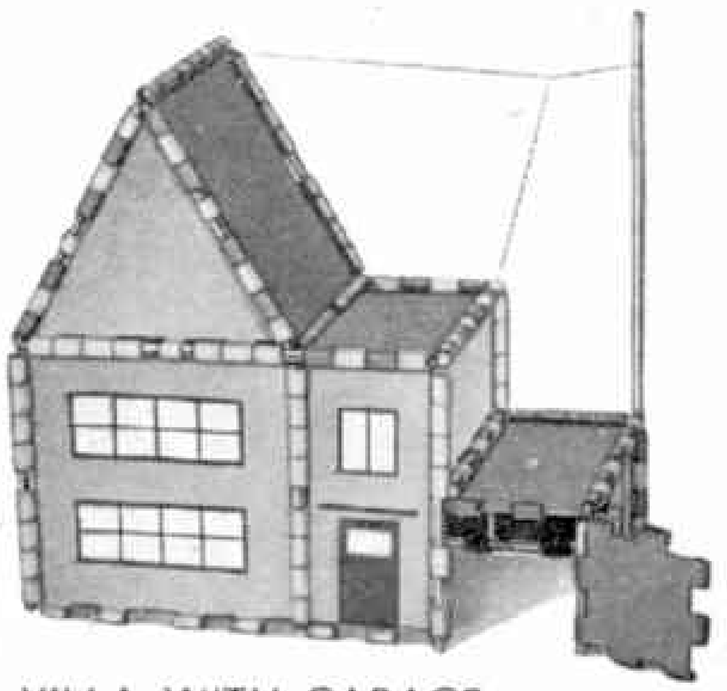

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